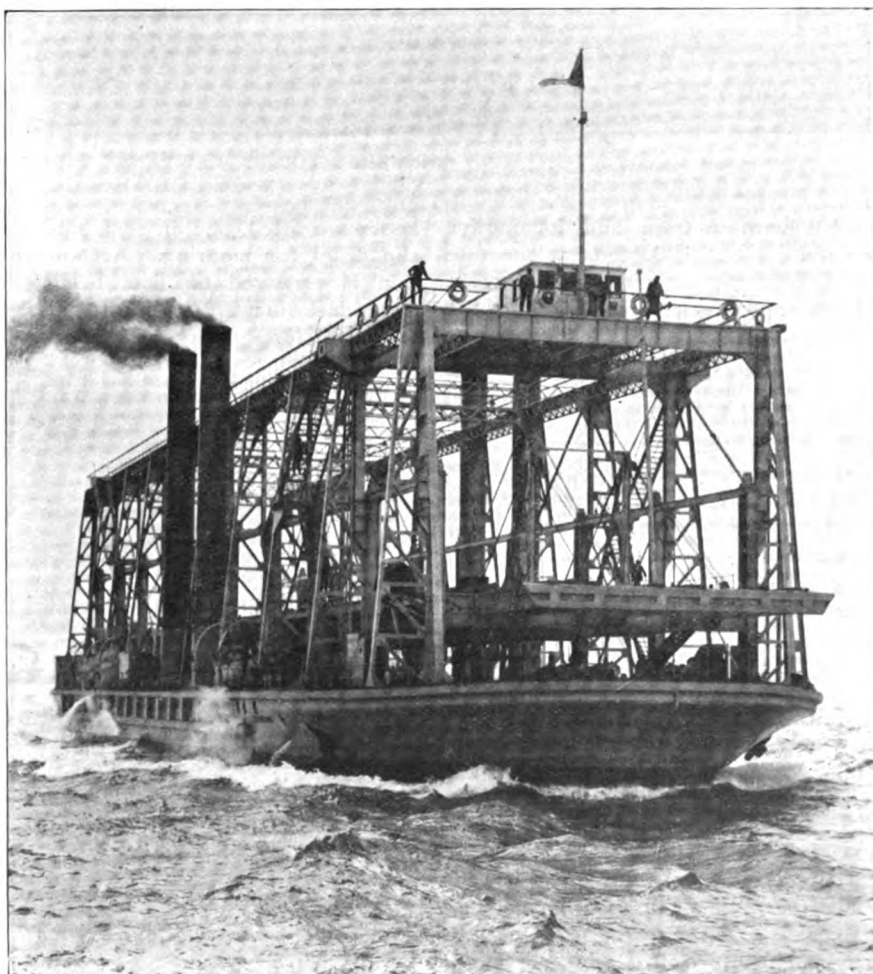


Canadian Car Ferry

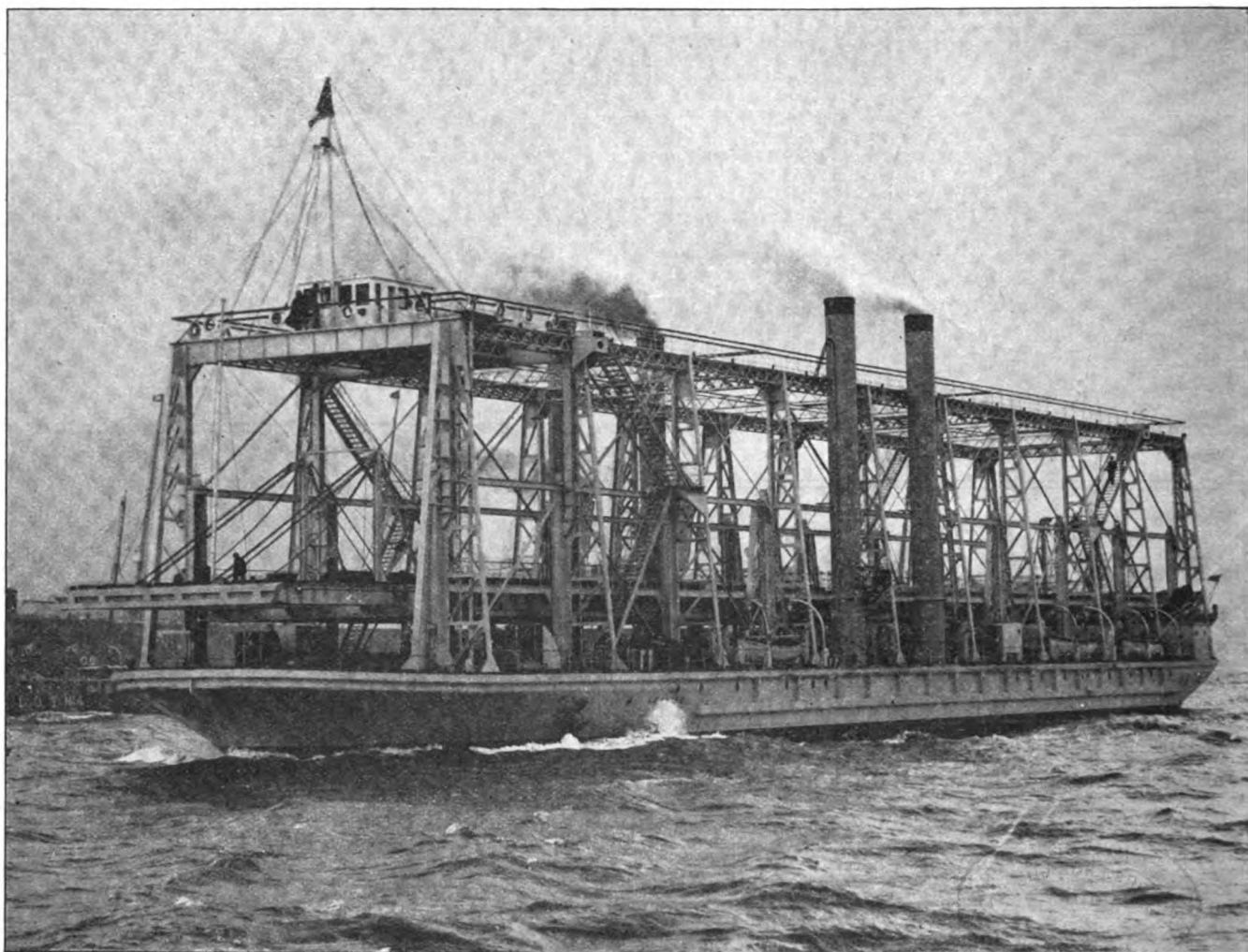
Description of the British-Built Steamer Intended for Service Between Quebec and Levis

THE official speed trials of the Canadian car ferry and ice breaking steamer built by Cammell Laird, of Birkenhead, for the Transcontinental Railway Co. of Canada, were successfully completed off the Mersey on July 23. Intended for service on the river St. Lawrence, between Quebec and Levis, this vessel—which is expected to leave for Quebec in the course of a few days—is a highly interesting specimen of naval architecture. Her principal dimensions are: Length, 526 feet; beam, 65 feet, with draught of about 15 feet. The propelling machinery consists of two sets of triple-expansion condensing engines, steam being supplied by eight single-ended cylindrical boilers working under natural draft. An ice propeller of nickel steel driven by a compound condensing engine is fitted at the forward end of the vessel, which is built to Lloyds special survey, and is arranged for the carriage of passenger and freight trains at all seasons of the year. The trains are carried on a tidal deck arranged above the main deck of the vessel, on three lengths of track, the length of each track being about 272 feet. The tidal deck rests on castings working up and down on 10 vertical lifting screws on each side, supported on columns, the columns being stayed by lattice buttresses against longitudinal transverse thrusts. The lifting screws are hung on ball bearings from the top and are manipulated by means of worm wheels driven from horizontal shafting which runs the length of the ves-

sel on each side. The horizontal shafting is worked by bevel gearing from a four-cylinder high-pressure engine of special design situated below the main deck. The gearing is arranged to lift the tidal deck fully



CAR FERRY FOR ST. LAWRENCE RIVER SERVICE

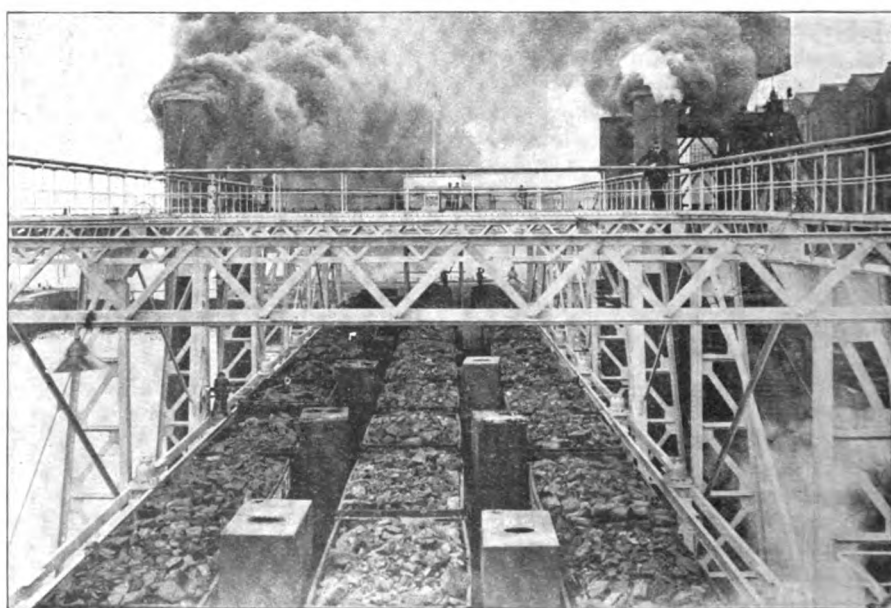


CAR FERRY FOR ST. LAWRENCE RIVER SERVICE

loaded with a train and locomotive weighing about 1,400 tons at the rate of 1 foot per minute, to a height of about 20 feet, which enables the ferry to be loaded or unloaded at any state of the tide. Exhaustive lifting trials have been carried out with entirely satisfactory results. At each end of the tidal deck an adjustable hinged gangway is suspended which allows for any change of trim or heel of ship due to unequal distribution of weights while taking the coaches on or off the vessel. Above the highest position of carriages on the tidal deck, a promenade is arranged with a bridge platform forward from which all the operations of steering and maneuvering are directed. The main propelling engines are situated abaft the boiler rooms and the engine for the ice propeller is placed in the hold just abaft the fore peak bulkhead. The vessel is fitted with electric light throughout and electric gear is provided for raising and lowering the end gangways and for hauling the railway carriages on and off. Special arrangements are made for heating the carriages during transit. Double wind-

lasses are fitted, one on each side with slip drum for mooring. Accommodation is arranged on flats below the main deck forward on both sides of the ship for officers and crew.

The owners were represented at the trials by Charles Duguid, chief constructor of the department of marine and fisheries, Ottawa, and by J. E. Hamilton, resident surveyor.



VIEW FROM TOP OF CAR FERRY LOOKING FORWARD

Extension of Trade

The Task That is Set Before a Competent Trade Organization—Various Forces Working in Harmony

By Charles J. Cohen, President Philadelphia Chamber of Commerce

FOR a commercial organization effectively to accomplish the purposes for which it is created it must be representative of the best elements composing the manufacturing and mercantile community of a city, and it should have the hearty support and co-operation of these elements. Such an association must aim to make its members realize that the organization is theirs; it must be so equipped as to be ready, not only to serve the business community in furthering policies dealing with fundamental questions, but must also be prepared to give specific data upon lesser problems which constantly arise in the course of business affairs. It must clearly demonstrate that it represents the effort of the individual combined with the efforts of the many, and make the organization an effective force for protecting and bettering the commerce of the city and for advancing the prosperity of its people.

Strengthening Commercial Organizations

Much study of late has been given as to the best method for strengthening commercial organizations in cities. In Philadelphia we have given particular attention to the subject during the last two or three years, and a mass of data has been collected from cities that have either passed through the process of amalgamating their different forces into a single effort for municipal progress, or are now passing through such a stage of development. The underlying fact contained in the data points to the creation of separate bureaus, all working in harmony, but each having a specific and well defined line to carry on, as being the best plan, under which a really effective organization may be created and maintained. These bureaus may be designated as follows, their names indicating the character of work which they would undertake:

- 1.—Traffic.
- 2.—Conventions, Publicity and Trade Expansion.
- 3.—Industrial Development.
- 4.—Foreign Trade.

*Paper read before the Convention of the National Association of Port Authorities, Baltimore, Md., Sept. 8, 1914.

5.—Charities.

6.—Legislation, Municipal, State and National.

The Traffic Bureau is first because transportation strikes at the very heart of industrial or commercial progress. In dealing with problems which arise before every business community relating to rate structures, problems which are fundamental and often incomprehensible to the merchant or manufacturer, a bureau headed by an expert familiar with the theory and practice of railroad transportation is essential if a city is to derive all the benefits to which it is entitled by reason of geographic location, or conditions which its people have developed, that may warrant its receiving concessions, in the handling of certain lines of traffic. Particularly at present when the freight rates of the country are going through re-

The great industrial centers of this country are now in lively competition, and the forces that direct trade through various channels are balanced with delicacy. Especially is this so with our seaboard cities where constant and intelligent supervision of ocean and inland freight rates is essential if the business of the port is to be maintained upon a scale justified by the facilities it may possess.

adjustment is such a bureau needed, and it is essential that it have united backing in putting forth its demands. If the demands of the business community come to the railroads divided or lacking in unanimity of expression, nothing results from the efforts made to secure redress from actual hardships. The great industrial centers of this country are now in lively competition, and the forces that direct trade through various channels are balanced with delicacy. Especially is this so with our seaboard cities where constant and intelligent supervision of ocean and inland freight rates is essential if the business of the port is to be maintained upon a scale justified by the facilities it may possess.

Such a bureau must also have facilities for serving members with information relating to rates, routings,

etc., assist them in collecting claims for loss or damage, or in adjusting overcharges. Such service not only renders valuable assistance to the merchant, but also strengthens the organization with many business men who do not appreciate the importance of the more fundamental questions with which it deals, and therefore brings to the association the support of many firms which would not otherwise be interested in its work.

Work of Publicity

Possibly next in importance is the work of the publicity bureau. Every city needs advertising. Its industries, its commerce and its civic advantages must be told if it is to advance in proportion to its possibilities. The organization which represents the city's commercial activity must be advertised in order that its influence may be broadened, its membership increased and kept interested and its efforts for municipal progress strengthened.

The bringing to a city of conventions of various trade associations means more business for retail merchants, hotels, places of amusement. By the expenditure of a few thousand dollars each year hundreds of thousands of dollars may be brought to the community in this way.

Every city should put forth a systematic effort to expand its industrial activity by attracting manufacturers and inducing them to establish plants within its borders. In this work an industrial bureau working in harmony with the traffic and publicity bureaus is essential. The traffic bureau must see to it that the new industry gets equal transportation facilities, for the distribution of its finished product, as are possessed by those already in such a community. The industrial bureau itself should study the conditions under which certain classes of goods may be manufactured, and determine what class may be produced and distributed to the best advantage in the particular community under discussion. Available factory sites should be noted, their values ascertained. A statement should be prepared showing the cost of manufacturing, such as taxes, fuel, power, water rents, etc. All such

data should be reduced to a compact form for ready reference in order that tangible facts may be at hand for instant use in influencing prospective manufacturers. In this work the publicity department must co-operate in spreading the facts broad cast, and in sending delegations of business men to different places where closer trade relations could be built up.

Extending Foreign Trade

Every year the importance of extending foreign trade is being realized by manufacturers with greater force. At the present rate of domestic consumption factories must curtail their output or remain idle part of the time. The nation that has a large foreign trade can readily discount local business disturbances. In capturing foreign markets the foreign trade bureaus, if such should be established by the various commercial organizations throughout the country, could render invaluable service. The Publicity Bureau can co-operate to advantage by sending literature translated into various languages to different countries, advertising the city's industries, while the foreign trade bureau itself should confine its work to studying the needs of foreign markets, and keeping manufacturers informed as to possibilities for getting foreign trade.

In the handling of subjects that come before the congress, the state legislature or the municipal administration, the best interests of a community can be served only through a representative organization that has the united support of at least the larger portion of the merchants and manufacturers and of all those who have the progress of the municipality at heart.

In a number of our large cities at the present time an unfortunate condition exists through a state of confusion which has arisen because of a multiplicity of trade and commercial organizations. Each has been formed for a specific purpose and in all probability good work has been done. They begin taking action upon general questions but unfortunately views directly opposite are reached in many cases; the efforts of the community toward accomplishing a desired object are divided and the congress, the legislature, the railroad officials, or whatever body may be petitioned naturally concludes that the community has no definite understanding of its requirements so that for this reason worthy and important projects tending to the city's progress are not consummated.

Let me again allude to conditions

existing in Philadelphia, so far as they relate to two of the largest and most influential organizations in that city.

In 1833 there was founded the Board of Trade, and for 50 years thereafter it ministered to the commercial wants of the community in admirable manner. But in 1891 there arose a demand for a more active protection of trade interests. The business community realizing that merchants traveling to the north or east from points south and west, should have the privilege of stopping over in Philadelphia if they so desired, without forfeiting the rights of through tickets, the Board of Trade was appealed to; it placed the matter before the railway authorities who flatly denied the demand. Then it was that some five and twenty men, earnest in their endeavor to obtain a reversal of the decision, formed a new organization called the Trades League, with dues twice the amount paid annually to the older one. In a few months it had a large following

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and upon presentation of the question of stop-over privileges, the railroad officials granted the right, which has since been continued under proper restrictions and regulations, which the holders of tickets have willingly accepted.

The new organization is now known as the "Chamber of Commerce"; it has had success in most of its endeavors. Its annual expenditure for commercial purposes is generous, and yet it has accumulated a principal fund of nearly \$80,000. As might be inferred, there has been a feeling of hesitancy on the part of the older body to fall in line with the policy of the newer one, hence the outcome of the project for a merger has not met with an enthusiastic response. This project came about in the following manner: A member of the board of directors of the Chamber of Commerce was elected a member of the executive council of the Board of Trade, but declined to accept the dual

office until assured that it was entirely approved by the members of both bodies. It is true that this is a form of interlocking directorate, not now meeting with popular approval, and in fact in 1913 the member referred to noting the fact that he was "persona non grata" to the officers of the Board of Trade on account of his earnest advocacy of the merger, resigned from the latter executive council. But to return:

After his acceptance of office, and serving on a number of committees of the two bodies, it became apparent that much of the work accomplished was done in duplicate, and whilst the expense was doubled the results were weakened, since it frequently happened that the conclusions of a committee of the one body would differ from those of the other, and when presented to a railway corporation or to a committee of city or state government the cause of the citizens was not benefited.

It occurred to this dual member to call the attention of the larger organization to this condition, hence an informal gathering of the directors took place. The matter was discussed and subsequently at a formal meeting of the directors a committee was appointed with authority to confer with other organizations with a view to a merger.

From time immemorial there have been men in organizations aware of conditions that should be changed, either lacking the vitality or the opportunity to carry into effect their recognition of wrongs to be righted, until finally a strong man, full of energy, seizes the correct—the psychological moment—as it is the present fashion to term it, and success follows; so that after a year or two of sparring there arose the man of the hour, Alba B. Johnson, president of the Baldwin Locomotive Works. He became deeply impressed with the advantages to accrue to a commercial community that could consolidate and center its influence. More resolutions and more committees have followed; at the moment the Chamber of Commerce has the matter well in hand since Mr. Johnson, still holding his place on the executive council of the Board of Trade, has been elected to the directorate of the former body, and there is every prospect of an early realization of our hopes.

Freight Bureau

Despite difficulties that have confronted it because of confusion that has arisen through action taken by the various organizations (many of them local clubs) the Philadelphia

Chamber of Commerce has successfully represented a large majority of the progressive merchants and manufacturers of the city. As an outgrowth of the effort to get the stop-over privilege on through tickets, mentioned above, hundreds of thousands of people are brought annually to Philadelphia by more than 50 excursions which the railroads now run every season to the New Jersey coast resorts. It was one of the first organizations in the country to establish a freight bureau, which has brought to Philadelphia additional facilities, protected the city's commerce in the adjustment of rates and classifications, and has given the members of the organization direct and valuable service by quoting freight rates, giving advice as to routing, collecting claims and adjusting overcharges.

The action it has taken on fundamental questions has always been received with respect by national and state legislative bodies, and through the work of its various committees on insurance, municipal affairs, telephone and electrical affairs, harbor and navigation, banking and currency and others, it has well served the people of Philadelphia. But it is felt that should the support which now is given to the various associations existing in Philadelphia be concentrated in carrying forward the work of one association, its usefulness could be vastly increased, the money which is now spent by business men upon divergent affairs could be expended without waste and a stronger feeling of co-operation would be created among manufacturers and merchants.

I cannot close without taking the opportunity of expressing to you, and with much feeling, the satisfaction felt by citizens of Philadelphia in having as our director of the department of wharves, docks and ferries a man of the stamp of Hon. Geo. W. Norris; without wanting to reflect in any way upon the occupancy of any other department (which are all being administrated to an unusually high degree) it should be noted that in Mr. Norris we have a man who represents every quality necessary to the efficient handling of so important a branch of the city's affairs, and as a member of the mayor's cabinet his wide knowledge and experience in both law and banking has made him an important factor in the municipal administration. When he leaves his place will be difficult to fill, and so it is our earnest hope that higher honors of a national character will not allure him from our municipality.

New Oil Tanker

The new oil tanker Cuyahoga built by the Greenock & Grange-mouth Dockyard Co., Ltd., Greenock, has been added to the fleet of the Anglo-American Oil Co., Ltd., London. The Cuyahoga is 376 feet by 53 feet 3 inches, by 23-foot draught, and carries 6,550 tons of oil in 23 tanks. Her engines are triple expansion with cylinders 27, 44 and 73-inch diameters by 48-inch stroke, supplied with steam from three large boilers. There is installed in her complete pumping machinery for the rapid handling of oil cargo, and heating coils have been fitted throughout the cargo tanks to facilitate the rapid discharge of the very heaviest grades of oil. The vessel is fitted with wireless telegraphy and has a complete outfit of deck machinery and electric lights throughout. On her speed trial she easily maintained a mean speed of 13¼ knots for six hours. The Cuyahoga has been built to the highest class of Lloyds under special survey and in accordance with the latest practice for this class of work.

French Ladder Dredge Badger

The old French ladder dredge Badger, built in Belgium in 1886 and operated in the Pacific entrance channel at Panama by the second French canal company and later beached, has been condemned on account of a defective hull. She is being stripped at the Cristobal dry dock and will probably be used as a boat landing at Balboa. The Badger was recovered by the Americans and rebuilt in 1908 at the Balboa shipways at a cost of \$58,624.50. With the exception of about four months of work in the Culebra cut, she was operated in the Pacific entrance almost continuously since that time.

The hull of the Badger is of iron, and is 112 feet 2 inches long, 29 feet 6 inches beam, and 11 feet 6 inches deep. The ladder was equipped with 32 buckets of 15 cubic feet capacity, and capable of digging to a depth of 45 feet below the surface of the water. In its rebuilt form, the dredge burned fuel oil, under three Scotch marine boilers, 96 inches in diameter by 103 inches long. The main engines were two in number, of French make, vertical tandem compound, with 12½, 25½ and 14½-inch stroke.

Three New Battleships

The navy department has awarded contract to the Newport News Ship Building & Dry Dock Co., Newport News, Va., for the construction of a 32,000-ton battleship, on its bid of \$7,116,000. Contract was also award-

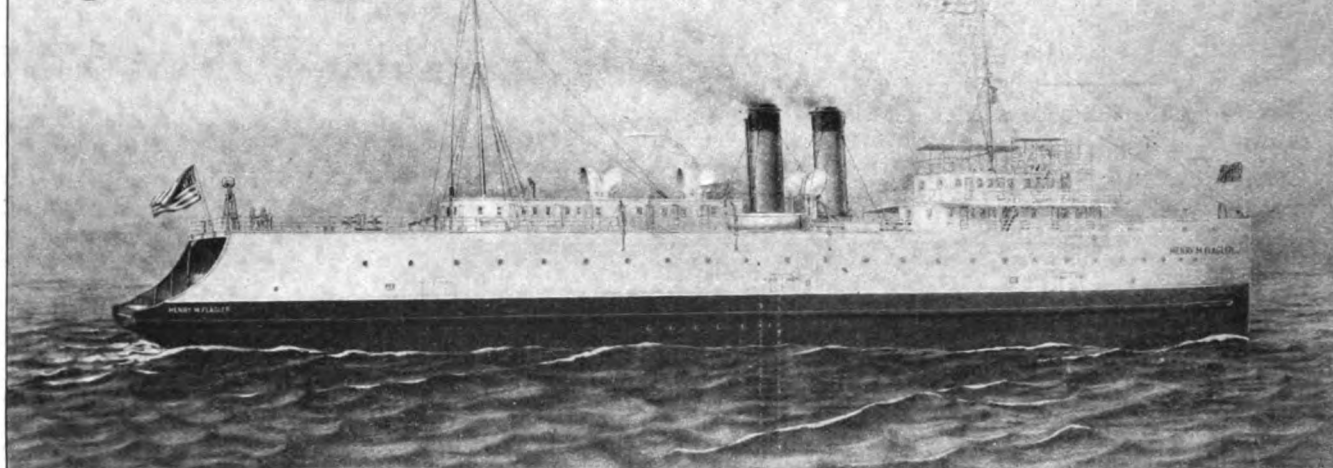
ed the New York Shipbuilding Co., Camden, N. J., on its bid of \$7,175,000 for the construction of a similar battleship. The other bidders were the Cramp Shipbuilding Co., Philadelphia, at \$7,625,000, and the Fore River Shipbuilding Corporation, Quincy, Mass., at \$7,440,000. A third battleship of equal size will be built in a government yard. These vessels are of the group comprising numbers 40, 41 and 42, already named by Secretary Daniels as the California, Mississippi and Idaho. These vessels will be the largest yet designed for the United States navy, each having a displacement of 32,000 tons, while the Nevada and Oklahoma have a displacement of 27,500 tons. The principal dimensions are as follows: Length over all, 624 feet; breadth between perpendiculars, 600 feet; breadth extreme, 97 feet 4½ inches; draft, 30 feet; speed, 21 knots. The main batteries will consist of twelve 14-inch guns and four submerged submarine tubes, and the torpedo defense battery will consist of twenty-two 5-inch rapid fire guns. The vessels will be turbine-driven, fitted with oil-burning boilers of the water-tube type, and will be heavily armored.

The salvers at work on the sunken steamer Empress of Ireland have recovered the purser's safe containing a large amount of silver bullion and valuables belonging to passengers. Seven bars of silver bullion out of a total of \$250,000 have been recovered, as well as a number of mail bags. The work of bringing bodies to the surface continues in a satisfactory manner, considering the fact that the vessel lies in over 130 feet of water.

The levels of the Atlantic and Pacific oceans at Panama at certain stages of the tide differ materially. At Panama, the difference between high and low water is usually 13 feet and at times 19 feet, while at Colon it is not much over 23 inches. The current that would be produced by this circumstance in a sea level canal would seriously interfere with navigation, but under the adopted lock canal this does not obtain. The Suez canal presented no such difficulty, there being practically no difference in tide level at Port Said and Suez.

It is reported that the United States Steel Products Co. is the low bidder on about 6,000 tons of fabricated material for a coaling dock at Cristobal, Panama, and the Jones & Laughlin Steel Co. has been awarded 650 tons of caisson plates for Panama canal work.

CAR FERRY HENRY M. FLAGLER



FROM A DRAWING FURNISHED BY M. C. FURSTENAU, NAVAL ARCHITECT

THE car ferry Henry. M. Flagler, building for the Florida East Coast railway, was launched from Cramp's ship yard, Philadelphia, on Sept. 22, and was christened by Miss Florence Marie Beckwith, to whom the ship building company presented a souvenir in the shape of a handsome necklace with diamond studded pen-

depth molded, 22 feet; deadweight capacity at 15 feet draught, 2,500 tons; speed, loaded, 13 knots.

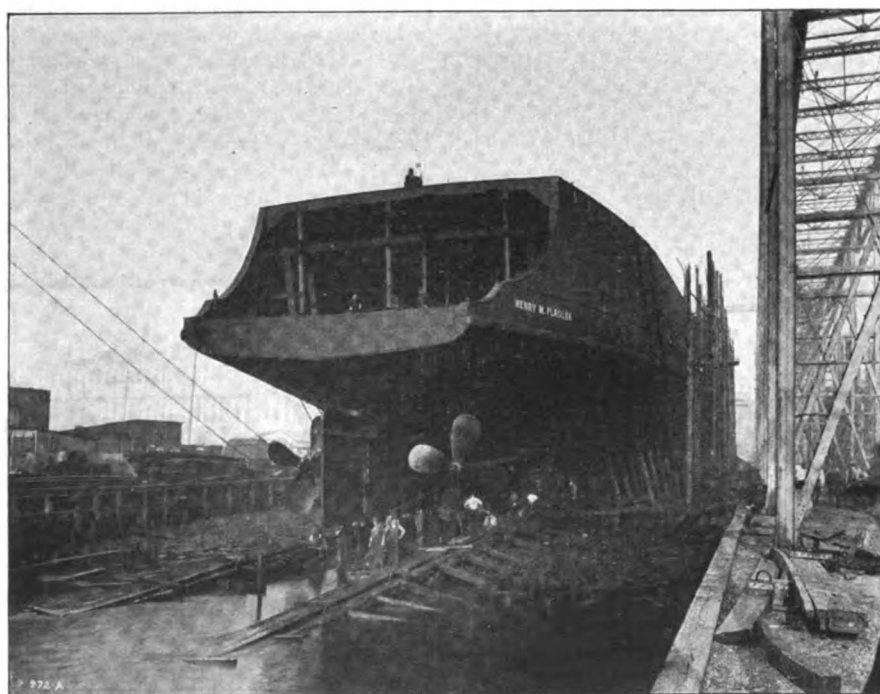
The steamer is arranged with four sets of tracks on the main deck and has accommodations to carry 30 of the largest size refrigerator cars. In addition the steamer is fitted with three cargo holds having a capacity of stor-

The power plant consists of two triple-expansion engines of the usual marine type, having cylinders 20, 32½ and 54 inches diameter by 36-inch stroke. Each engine is designed to develop 1,500 horsepower. The boiler plant consists of four Scotch type boilers, each 13 feet 2 inches diameter by 12 feet in length, fitted with two 48-inch Morrison corrugated furnaces. The boilers will be operated under the Howden system of forced draft and are built for a working pressure of 170 pounds.

The usual auxiliaries are fitted in the engine room, the only notable difference being the fitting of two 12-inch centrifugal pumps by which the ballast tanks can be filled or emptied in a short space of time.

The keel for the steamer was laid on April 20 and it is expected that she will go into commission during the early part of December. The car ferry will be used in transferring cars from the railway train at Key West, Fla., to Havana, Cuba, the distance being about 100 miles. It is expected to make the run from dock to dock in eight hours. The construction of this car ferry realizes in a way the dream of Henry Flagler to establish an all-rail service to Cuba.

Contract has been awarded the Newport News Ship Building & Dry Dock Co., Newport News, Va., for lengthening the steamers Ceiba and Yoro for the Vaccaro Brothers Line, of New Orleans, at a cost of \$50,000 each. These vessels have been operating under the Honduras flag but will be changed to American register after alterations have been completed. Both vessels will be lengthened 40 feet.



STERN VIEW OF CAR FERRY H. M. FLAGLER

dant. Miss Beckwith is the daughter of the president of the Florida East Coast railway. The car ferry was designed by M. C. Furstenau, naval architect, and her general dimensions are as follows: Length over all, 360 feet; length between perpendiculars, 348 feet; breadth molded, 57 feet;

ing approximately 3,000 tons of cargo. Each hold is served by a double drum electric cargo hoist. In addition to the dry cargo, one of the forward ballast tanks has been arranged for carrying molasses, the necessary filling and discharging apparatus being fitted.

The Engineer's Part

The Problem of Port Development as it Presents Itself to the Engineer

By Francis Lee Stuart, Chief Engineer Baltimore & Ohio Railroad

IT IS a pleasure to extend a welcome from the people of Baltimore and the Engineers' Club of Baltimore to members of the National Association of Port Authorities and guests, and particularly so at this time when we are celebrating the 100th anniversary of the bombardment of Fort McHenry and the writing of the inspiring "Star Spangled Banner".

I am addressing you as an associate member; one who is interested in your purposes and work.

My subject is "The Engineer's Part in Port Development". It should be entitled "An Engineer's Thought on Some Parts of Port Development and Its Problems". From the nature of the construction for port development an engineer is selected to design, oversee and superintend the physical construction of piers, docks, the dredging and various other works which pertain to the port, but I would like to impress upon you the importance of calling upon him for consultation on the larger aspect of port development. From the engineer's very training, they have been spending their lives in trying to sift the wheat from the chaff, get at the realities and to see things as they are, for the purpose of accomplishing results.

I am connected in an official capacity with the Baltimore & Ohio railroad, and we are intimately a part of the life of Baltimore, which city indeed gave our company birth, and thereby became the first city in the country to meet the problems of interchange facilities for rail and waterborne traffic. It would be a pleasure to discuss with you many questions we are meeting locally, but will refrain, except to say that I heartily concur in the necessity for the completion of the 35-foot channel and for the construction of a ship canal from the Chesapeake to the Delaware, so that my remarks will be general, and simply a statement of my personal opinion, for whatever value it may be to you in your efforts to crystallize certain principles of port development and administration.

A port is that part of a large city

*Paper read before National Association of Port Authorities, Baltimore, Md., Sept. 8, 1914.

which is used for a terminal for water and rail and other transportation agencies.

Port Intimately Associated With City

The port is so intimately connected with the city itself that the harbor section cannot be separated from the general problems of municipal growth, except possibly as to its finances, and must be subordinated and become only a part of the general municipal policy. Aside from the many minor influences on its development the two predominating influences in the proper solution to increase its efficiency for the comfort, convenience and pleasure of the community, and economy of service to the business and manufac-

The port is so intimately connected with the city itself that the harbor section cannot be separated from the general problems of municipal growth, except possibly as to its finances, and must be subordinated and become only a part of the general municipal policy. Aside from the many minor influences on its development the two predominating influences in the proper solution to increase its efficiency for the comfort, convenience and pleasure of the community, and economy of service to the business and manufacturing interests are the water transportation interests and rail transportation interests.

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Both of these transportation interests carry passengers, freight for local zones adjacent to and within truckage distance of a terminal, package freight for trans-shipment and bulk freight for trans-shipment.

In the matter of passenger travel, the movement of people from one section to another tends to a national spirit, a unity of thought, a greater degree of education and cultivation, an increase in business, an interchange between sections and the happiness and contentment of the people, and there is no more important civic matter for the comfort and growth

of a community than that the distributing points for travel to and from a city should be so located that access to and from the homes and offices of the community should be with the least expenditure of time and energy in proportion to the length of the trip undertaken. Generally speaking, travel by rail far exceeds the amount of travel by water, and the railroad trip is a matter of hours while the water trip is a matter of days. Unless there are special conditions, the two interests do not compete, and one is forced to seek the waterfront and the other is usually located near the center of the city.

Freight for local zones had formerly, on the part of the water interests, been merely transfer of cargo, between water crafts and horse-drawn vehicles. Economies required by competition have reduced these zones within the section of industrial utilities to a trucking distance of one or two miles, and evolution of the efficiency of pier use and the size of vessels caused a demand that this effective zone of influence should be increased by connection with rail interests, so that the other industrial zones of the city may be reached economically. On the railroad side, their entrance into a city and lines through a city have caused industrial zones to arise, which are served by local freight stations, and they have no desire for piers of this character except in zones along the harbor, which they are unable, for financial reasons, to serve by their own rails. When they do use pier space for this purpose, with their own water equipment, 100 per cent of the business passing through such a pier is for the convenience of the immediate industrial zone around that pier.

Package freight for the prompt dispatch and economical handling demanded by commerce, requires rail connection for the transfer of cargo between vessel and car, and where the larger part of the cargo is of this character the ship must seek such a pier.

Bulk freight for trans-shipment, such as coal, ore, grain, lumber, etc., require certain kinds of equipment on land and water, are trans-shipped at

piers having special facilities and are usually, or should be, kept out of the congested industrial section of the harbor.

An analysis of the business handled and its relation to industries adjacent, and the economic requirements of both water and rail interests, would indicate that the logical preferences of locations of piers should be as follows:

1. Passenger business, such as ferry, excursion, short haul coastwise.
2. Piers for either railroad floating equipment or coastwise business of which 100 per cent of the freight passing through the pier is for distribution within a tracking zone to interests which have been built up on the basis of such a facility.
3. Shipping interests, the larger part of whose business is for local trackage distribution.
4. Ocean liners carrying passenger traffic and general cargo.
5. Ocean freighters carrying large proportion of general cargo.
6. Package freight for trans-shipment.
7. Bulk freight for trans-shipment.

For the first two classes rail connection with pier is not necessary and often, from the congestion caused at such points, not even desirable; for the third and fourth, rail connections with piers is desirable, but not absolutely necessary; for the fifth, sixth and seventh, rail connections with piers a necessity.

There is a great difference in the financial and physical requirements of the interests for handling the various classes of business enumerated.

From the growth of the industries of our country the largest proportion of water freight is collected by the railroads and brought to the ports.

Coastwise Shipping Business

Seventy-five per cent of the business of coastwise shipping companies of the ports of the United States is for trans-shipment from a port to another port for distribution by rail to interior points, or received by rail at a port for transportation to another port for distribution. Ocean-going business is very similar to coastwise trade, and the largest proportion of ocean-going freight is collected at a port by railroad routes for transportation to another port for further distribution by rail.

For the shipping interests, the right of way is free and their capital account is practically the cost of the carrying units (the ship),—and their operating account, the running expenses and dockage facilities at their port terminals—and in their opera-

tion and methods of business they have a great flexibility, and are in the enviable position of being able to withdraw their carrying units from a pier, or unprofitable locations, or a port, or even a country, as the business demands. Their rates are made by competitive business conditions and not by political commissions, except in so far as they are affected by wise or unwise maritime laws of the nations under which they sail.

The railroads, which are the largest co-partners or agents for the collection and distribution of freight for the water interests, are as pre-eminently a part of the port as the shipping and should also be considered as one of the primary parts of a port.

The conditions under which their part in the port development is carried on should be borne in mind. Under a federal valuation act the Interstate Commerce Commission has un-

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dertaken the valuation of all the railroads of the United States, and regardless of the purposes which were in the minds of the instigators of such a valuation, in my opinion it will result in a benefit to the railroads and, through them, even to the water interests. Among the results which will be accepted as facts, it will surprise me if it is not found that at least 30 per cent of the capital of the trunk lines is invested in terminals in cities having water transportation, and possibly 50 per cent or more of their capital in what may properly be termed terminals of all kinds in all cities. This sub-division of the capitalization of the railroads alone will give you an idea of the problems which confront the railroads, and also, the port authorities, for part of their problems are your problems.

The railroad system may be likened unto a tree, with rootlets and leaves and branchlets being the necessary terminals for collection and distribution of the elements which pass up and down the trunk and larger branches of the tree, the branchlets

and rootlets costing 50 per cent of the entire capitalization, and the branchlets and rootlets, when once built, are fixtures, immovable and without flexibility.

It is for this reason, among others, that I am unable to satisfy my mind that there is any outstanding rational method so far advanced for basing rate regulation on the cost of haul of any one commodity between any particular localities on a large system.

Rate Based on Haul

The rate is based on the haul, on the portion of the length of the trunk and main branches used, the entire length of which represents 50 per cent of the capital cost of the investment, and is subject to control of political commissions, whose rulings are subject only to the application of a court test of confiscation of its individual rulings and, so far, no court test of its collective rulings which, after all, should be the final test, and the results of which are burdening and from the facts submitted, in my opinion, unnecessarily retarding the growth of this great transportation agency and the country.

Referring particularly to the railroad situation at a large seaport. Such a city usually has four distinct districts of utility; first, the waterfront; second, the industrial district; third the business district, and fourth, the residential district, through all of which zones the railroads have to buy a right of way to even reach the waterfront and, having reached it, in addition to lighterage and floating equipment, piers have to be constructed at their own expense which are suitable to the particular kind of business which they carry on, with special loading and unloading facilities, and which become obsolete as soon as the character of the business changes. Owing to its obligations to the industrial interests which have located along its lines through the city it is practically impossible to abandon such a line, or a portion of it, even if the growth of the city and the municipal demands for grade crossing elimination or other city improvements, which such a line is universally subject to, makes the investment so great that the business is unprofitable and a burden to the railroad. As to a railroad company building along a waterfront, even where needed and the financial returns on present cost make it possible, it has been made so difficult by the municipal authorities, and has such possibilities of unlimited burdens being placed on the investment,

that such building has practically ceased.

In my opinion, if it had not been for the financial aspect brought on by various causes, which has slowed down advancement and progress in this country the railroads, at the present time, would be unable to handle economically, or at least expeditiously, if at all, all the business which would be offering. Unless rail transportation interests are encouraged by being allowed to earn attractive returns on their present investment as a surety of further returns on the additional capital needed to keep its facilities in pace with our growth, they will not be able to handle the normal expansion of our commercial interests in the United States, particularly at their terminals and ports.

The past history of our ports in a general way, to date, has been that private individuals or corporations have been forced to buy their waterfront, build their piers as opportunity offered and finances permitted, on the prospect of securing a profitable business; in other words, taking the business risk and it is only recently that, to any extent, municipal authorities have begun to formulate plans, or to expend money in carrying out such plans, or to provide more efficient facilities on the waterfront and, so far as I know, even such action has confined itself to buying out going concerns, remodeling and re-renting, and there has been no municipal action which involves the creation of port facilities on undeveloped property, or which approaches in any way the business risk or initiative which has been taken by private individuals or corporations.

Community of Interest

To summarize, I have tried briefly to show the community of interests of water and rail transportation; the business handled, the method of handling required, a rational preference of location based on the business handled, the physical and financial requirements under which these interests operate and the influences which affect the rate, that the railroads cannot proceed with the developments of the ports in the future as in the past, that there is a demand for increasing facilities at the cities and their ports to keep pace with the growth of the country, and that municipal development so far has been inconsequential in proportion to the interests involved.

What is the remedy? What can the port authorities do to help the situation? A city should be developed with a due relationship to all

its units, of which the port is only one; waterfront property possesses value and gives returns to the community to the extent that it is properly utilized through intelligent supervision—ownership will permit of such supervision.

Excepting piers for bulk trans-shipment, it is my opinion that piers in cities of a certain class should be publicly owned so that the assignment of piers to private or corporate interests can be decided on the most efficient basis for the necessities of the city, that a belt line should connect a large part of these piers with the industrial zones which grow up around the city.

The problem, however, is not the actual building of the piers or of the belt line, or the money involved, but it is to find a policy to carry out such plans which will not reduce the value of the millions which private and corporate interests have taken in business risks in developing the growth of the city in the past, or, in other words, to punish them for having been a factor in such growth. This is the one great problem of the port authorities of America and the one which should receive your most serious thought, and if you can work out a method of settling this problem with fairness and equity, you will receive the support of all the factors which go to increase the growth of your city. It has so many angles that it would be too lengthy a subject for me to discuss on such an occasion.

There is one other thought which I would like to express to you from a railroad man's point of view. We often hear and read statements that the railroads of most cities have attempted to dominate the waterfront, to limit competition by water carriage, that they oppose the Panama canal, that they fight the improvement of canals or river improvements, and so on. To my mind, this is the expression of a man with paucity of ideas who builds a house of cards to knock down. From the very nature of things any improvement of our transportation facilities of any kind whatever, water, electric lines, trolleys, motors, improvement of our rivers, etc., cannot help but increase inherently the amount of rail transportation.

It may be that there may have been criticism of the economic aspect of government assistance to water interests that the amount of business encouraged did not compensate for the cost but in my opinion any antagonism or criticism of any such undertakings per se, does not represent the mental attitude of the men who are

the brawn, sinew and brains of the railroad interests.

The purposes of your association are entitled to support. Any relief of congestion in the cities which the port authorities can bring about should be welcomed and assisted in any way possible, and I wish you a full measure of success.

Personal

Price, Alburn & Daoust, 712-724 Rockefeller building, have recently extended their admiralty department to include all branches of admiralty and maritime law. Mr. Daoust is in charge of this department.

Paul P. Whitham has resigned as chief engineer of the Port Commission of Seattle and will enter private practice as consulting engineer with offices at 423-425 New York block, Seattle. Mr. Whitham will specialize in matters relating to harbors, docks, warehouses, industrial buildings, freight handling equipment, railways, terminals, etc.

The Union Iron Works, San Francisco, Cal., recently completed a steel caisson 113 ft. long and standing 32 ft. above the water, for the Panama canal. It is the largest structure of its kind ever built in this country and cost \$335,000. The tug Hercules is now enroute to the canal towing the caisson and is due there late in October.

The Canadian Pacific Co. is about to put in commission the steamers Mis-sanabie and Metagama, recently built in Scotland. These vessels are 520 ft. by 64 ft. by 41 ft., and will have accommodations for 520 cabin and 1,200 third-class passengers. They will carry a crew of about 300 men each.

The Merritt & Chapman Derrick & Wrecking Co., 17 Battery Place, New York, is now engaged in laying a 36-inch submarine pipe line known as the Narrows Siphon across New York bay from the foot of Seventy-ninth street, Brooklyn, N. Y., to Tompkinsville, Staten Island, N. Y. Passing vessels are requested to slow down and to give this plant as wide a berth as possible.

The two tugs building by the Staten Island Shipbuilding Co., Port Richmond, N. Y., for the Panama Canal, are to be named Gorgona and Tavernilla, after two important canal zone settlements which have gone out of existence through the creation of Gatun Lake. The site of Tavernilla now lies under Gatun Lake and Gorgona was formerly a village on the Chagres river.

Early Days on the Lakes

*An Interesting Letter from Capt. R. D. Swain Who
Recalls Freight Rates That Make the Mouth Water*

CAPTAIN George P. McKay, treasurer of the Lake Carriers' Association, received a short time ago a picture of the schooner A. E. Hart from Capt. R. D. Swain, of Kansas City, Mo. Captain Swain, who is now connected with the live stock industry in Kansas City, sent a number of these pictures to old friends to commemorate his seventieth birthday on Aug. 13. Capt. Swain was long identified with the lakes. He began sailing in the spring of 1860, when he was not quite 16 years old and his first captaincy was the schooner A. Buckingham in 1865.

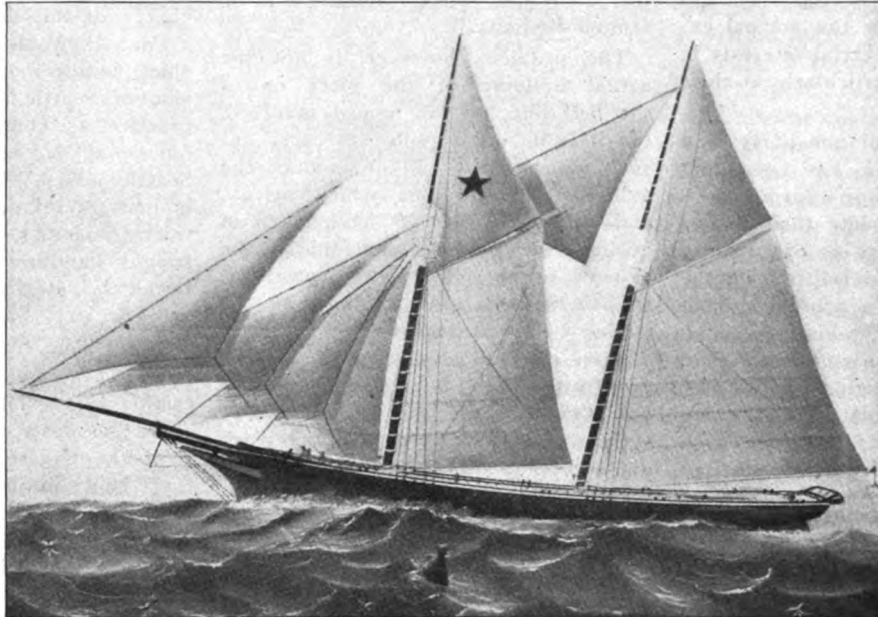
Capt. Swain comes from a generation of sailors. On his father's side he traces his ancestry back to John Swain and John Gardiner, two of the nine men who bought Nantucket Island from an Indian in 1630, for a consideration of 30 pounds sterling and two felt hats—one for his squaw and one for himself. The family showed sailors in each generation from that period. Capt. Swain's mother, Lucina Drake, traces her ancestry back to Sir Francis Drake, the distinguished pirate who was subsequently commissioned admiral by Queen Elizabeth in 1587, and the Drakes show up on the quarter deck at intervals ever since.

THE MARINE REVIEW wrote to Capt. Swain for some of his recollections and received the following interesting letter from him:

"I have for acknowledgement your valued favor of the 24th inst. and am mailing you under separate cover a picture of the schooner A. E. Hart. It is from a number I had struck off from a large one of her to send to a few of my old associates, believing that pleasant memories would thereby be revived of by-gone days and conditions. Except that her mainmast has a little too much rake it is a very good representation of her.

"She was one of four built at Buffalo from the same molds (about 1856) by Frederick Jones. The Hart had five

more frames amidship, making her 10 feet longer than the others (the schooners Dauntless and Imperial, and the bark Invincible). This latter vessel carried a royal, top-mast and top-gallant studding sails, and, under the command of Capt. Joseph Kendrick, had the repu-



SCHOONER A. E. HART

tation amongst the forecandle sailors of being "the wild boat of the lakes." In a measure this reputation may have been well-founded, and I well remember that Capt. Kendrick, in giving me some advice as a youngster at the time I received my first command, among other things, said: 'Never favor the watch below when it can be used to advantage on deck; in fact one passage for a sailor is generally enough, as after that they become too well acquainted.' The Invincible was generally at the head of the procession, and, with the wind free and plenty of it, she was what her name indicates.

"The Hart went ashore on Presque Isle, Lake Huron, during the fall of 1868 and was a total loss. She was sailed that season by Capt. Huntoon. Up to that time she had been a very lucky vessel. The first year I sailed her (1866) was a record for freight. The maximum rate was 16 cents per bushel on wheat Chicago to Buffalo; \$6.00 per ton on ore, Marquette to Lake Erie ports, and \$6.00 per m on lumber from the head of Lake Michigan to Chicago. About the first of November that same year the schooner Goshawk,

Capt. Wm. Buffington, the bark Major Anderson, Capt. John W. Moore, and the Hart, arrived in Chicago within an hour of each other. The wind had been S. E. to S. W. for nearly a week. Every grain-carrying vessel had gotten out of Chicago and there had been no

arrivals for several days, hence there was strong bidding amongst the shippers. As a result the three of us got 16 cents per bushel on wheat to Buffalo. We had coal up at \$2.50 per ton. The Hart's up-cargo was 600 tons, and she took back 21,000 bushels of wheat. The trip before this went light to Traverse Bay, I there loaded 310,000 feet of lumber for Chicago at \$6.00 per m, and received 10 cents per bushel on wheat back to Buffalo. Our net earnings for the season's business lacked very little of covering the purchase price of the schooner, the January previous.

"Referring to the \$6.00 per m on lumber from Traverse Bay to Chicago, reminds me of the fall of 1865, when the reciprocity treaty between Canada and the United States came to an end Jan. 1, 1866. The lumber dealers were then anxious to import all the lumber possible from Canada before the expiration of the treaty. I arrived in Buffalo from Chicago the last of November with the schooner A. Buckingham. The lumbermen had their agents out who boarded us as we struck the dock. Bidding was quite brisk and I finally chartered for a cargo of lumber from Port Stanley, Canada, to Cleveland, at \$6.00 per m, thus making a very good freight to wind up the season—especially so as I had just delivered a cargo of wheat at 12 cents per bushel.

"By way of comparison with present times: the topsail schooner Flight, (Capt. George Young) in 1862, had a season contract from Marquette to Cleveland on iron ore at \$3.25 to \$3.50 per ton. Her capacity was about 350 tons. I was second mate of her that season. We made 13 round trips, thus

going through the lakes 26 times to carry 4,500 tons, or about one-third of the cargo of the steamer Wm. P. Snyder Jr. We were two days each trip unloading, while now 10,000 tons are handled in about three hours.

"Those were strenuous times. The rivalry amongst captains was intense and caused many of them at times to take fearful chances. There were no breakwaters such as now protect the harbors at Chicago, Buffalo and Cleveland, but instead there were two jetties running out into the lake between which the captains would often drive their vessels when the sea was breaking over the top of the lighthouse.

"Much could be written that would be interesting to those who took part in the activities of the times referred to, but there are so few of us left it would hardly be fair to encroach farther on your valued space; besides we older fellows must not dwell too much in the past as we might lose interest in the present booming times.

"I do not feel like closing without referring to the pioneers in the trade between the lakes and Europe. 'There were giants in those days'—not in stature, but in the qualities that make generals in their business—hence I mention a few who come to mind: Capt. A. R. Manning took the schooner John F. Warner across, making two voyages, one in 1859 and another in 1860. Capt. Thomas Burke took out the schooner R. H. Harmon the same years. These vessels belonged to T. P. Handy, of Cleveland. He also owned the cargo and insured neither, thus showing his confidence in his masters. Capt. Alfred Davis took out the schooner Vanguard; Capt. James Smith, the schooner George W. Dousman; Capt. Ben Wolvin (the father of Capt. A. B. Wolvin, of Duluth) the Chieftain, later the Africa; Capt. Smith Moore, the bark C. J. Kershaw, in 1857. He traded outside that winter, returning the next season to the lakes. Afterwards he took out the brig, Blackhawk. Capt. Isaac Morris took out the schooner Correspondence; Capt. Pennington, the bark D. C. Pierce; Capt. Charles Gale, the schooner Geo. N. Deshler; Capt. David Tucker, the bark Thermutis, etc., etc. Of the above mentioned only one is amongst the living today, and he (Capt. A. R. Manning) is an honored and respected citizen of your city."

Charles L. Rohde & Sons, Baltimore, Md., have under construction at their yard two lighters, one for the Empire Coal Co. and the other for the Ellicott Machine Co., both for service in Baltimore Harbor. This company recently launched an open lighter, 128 ft. by 28 ft. by 8½ ft. for the Forman-Blades Lumber Co. of Elizabeth City, N. C.

Items of Interest

The Newport News Ship Building & Dry Dock Co. recently completed the new oil tank steamer John D. Archbold for the Standard Oil Co. of New Jersey. This vessel is a duplicate of the John D. Rockefeller and is designed for a total deadweight capacity of 10,000 tons on a draught of 23 feet 4 inches. She can carry about 67,500 barrels of oil, and is equipped for burning either coal or liquid fuel. Wireless apparatus, tel-emotor control of steering gear, a McNab revolution and direction indicator are included in her equipment, and her design gives her a very large capacity on draft light enough to enable her to enter almost any port of the world.

J. Murray Watts, naval architect, of Philadelphia, has been awarded contract by the Macon-Atlantic Navigation Co., of Macon, Ga., for designs and specifications for a fleet of 10 steel cargo barges of the twin-screw, tunnel-stern type, for service on the

Ocmulgee and Altamaha rivers between Macon and Brunswick. These barges are to be propelled by two 50-horsepower oil engines and a 12-horsepower auxiliary oil engine will also be fitted for the pumping plant and generator, the latter to supply electric lights throughout the boats, as well as a searchlight.

The seventh annual convention of the Atlantic Deeper Waterways Association was held from Sept. 22 to 26 inclusive. The delegates spent four days aboard the steamer Berkshire, of the Hudson Navigation Co., observation outings of New York harbor and business meetings being held aboard the boat. A reception was held at Albany and a luncheon tendered the delegates by the Perth Amboy Board of Trade, at Perth Amboy, N. J.

Bids will be opened on Nov. 10 by the Navy Department for the construction of six torpedo-boat destroyers, Nos. 63 to 68, and on Dec. 15 for eight submarines, Nos. 52 to 59.

SUMMARY OF NAVAL CONSTRUCTION.

		Per cent of completion.			
Name of vessel.	Contractor.	Total.	Oct. 1, 1914.	Sept. 1, 1914.	Per cent on ship.
			Per cent on ship.	Total.	
BATTLESHIPS					
Nevada	Fore River Ship Building Co.....	75.8	69.7	73.3	66.0
Oklahoma	New York Ship Building Co.....	76.3	74.0	74.1	71.7
Pennsylvania	Newport News Ship Building Co.....	51.6	42.7	47.2	37.3
Arizona	New York Navy Yard.....	33.6	27.0	29.2	22.4
DESTROYERS					
Downes	New York Ship Building Co.....	95.3	95.3	95.3	95.3
O'Brien	Wm. Cramp & Sons.....	85.2	83.5	83.0	80.9
Nicholson	Wm. Cramp & Sons.....	84.2	82.6	80.2	77.8
Winslow	Wm. Cramp & Sons.....	79.3	75.9	73.5	70.3
Cushing	Fore River Ship Building Co.....	68.1	64.7	62.2	58.0
Ericsson	New York Ship Building Co.....	85.3	85.2	82.0	81.6
Tucker	Fore River Ship Building Co.....	16.0	9.1	14.6	7.7
Conyngham	Wm. Cramp & Sons.....	28.7	24.6	19.8	14.6
Porter	Wm. Cramp & Sons.....	15.0	8.0	12.3	5.5
Wadsworth	Bath Iron Works.....	62.2	59.0	57.0	53.7
Jacob Jones	New York Ship Building Co.....	28.6	27.0	23.8	20.5
Wainwright	New York Ship Building Co.....	28.1	26.5	21.4	18.1
DESTROYER TENDERS					
Melville	New York Ship Building Co.....	65.5	63.8	62.8	60.8
SUBMARINES					
G-4 (2)	American Laurenti Co. (Phila.).....	96.4	95.5	96.4	95.5
G-2 (1)	Lake Tow Boat Co. (Bridgeport).....	89.7	89.7	89.7	89.7
G-3 (1)	Lake Tow Boat Co. (Bridgeport).....	83.0	82.6	83.0	82.6
K-3	Electric Boat Co. (Seattle).....	99.7	99.7	99.0	99.0
K-4	Electric Boat Co. (Seattle).....	99.7	99.7	99.0	99.0
K-6	Electric Boat Co. (Quincy).....	*	*	99.5	99.5
K-7	Electric Boat Co. (San Francisco).....	98.1	98.1	94.7	94.7
K-8	Electric Boat Co. (San Francisco).....	98.1	98.1	94.8	94.8
L-1	Electric Boat Co. (Quincy).....	61.7	57.6	55.5	49.5
L-2	Electric Boat Co. (Quincy).....	58.8	54.3	55.7	49.5
L-3	Electric Boat Co. (Quincy).....	58.3	53.4	53.8	46.7
L-4	Electric Boat Co. (Quincy).....	57.3	51.9	53.1	45.9
L-5	Lake Tow Boat Co. (Bridgeport).....	37.5	31.4	34.0	28.6
L-6	Lake T. B. Co. (Long Beach, Cal.).....	38.1	32.6	33.7	29.0
L-7	Lake T. B. Co. (Long Beach, Cal.).....	36.4	30.5	33.0	28.0
M-1	Electric Boat Co. (Quincy).....	44.8	38.9	38.7	32.9
L-8	Portsmouth, N. H., Navy Yard.....	.....	.....	.....	.....
L-9	Electric Boat Co. (Quincy).....	20.0	13.6	14.9	8.8
L-10	Electric Boat Co. (Quincy).....	19.3	12.9	14.6	8.5
L-11	Electric Boat Co. (Quincy).....	4.1	.....	.....	.....
SUBMARINE TENDERS					
Fulton	New London S. & E. B. Co. (Quincy).....	94.0	94.0	90.6	90.6
Bushnell	Seattle Construction & D. D. Co.....	63.0	54.7	52.9	44.8
FUEL SHIPS					
Kanawha	Mare Island Navy Yard.....	78.9	78.3	75.0	74.4
Maumee	Mare Island Navy Yard.....	48.8	48.1	41.9	40.2
MISCELLANEOUS					
Supply Ship No. 1.	Boston Navy Yard.....	.....	.....	.....	.....
Transport No. 1....	Philadelphia Navy Yard.....	1.3	.....	.....	.....
PANAMA CANAL COLLIERS					
Ulysses	Maryland Steel Co.....	50.9	43.7	42.2	35.8
Achilles	Maryland Steel Co.....	45.1	35.4	37.6	28.0

(1) Contracts forfeited, vessels being completed New York yard.

(2) Conditionally delivered at Philadelphia yard Jan. 22, 1914.

*Delivered Sept. 8, 1914.

Our Need of Ships

*What it is Costing This Country to be
Without an Adequate Merchant Marine*

By W. E. Humphrey

THE alarming condition in which we find ourselves today because we have no merchant marine is entirely due to our own inexcusable neglect. Those today who are most frantic in appeals for help are most to blame for our present situation. It has been the cotton raiser of the south and the corn grower of the middle west that has prevented us today from having a merchant marine in this time of great stress to carry our foreign commerce and to bring home American citizens now stranded in Europe. While we today regret this calamity that causes all to suffer, yet, in the fact that the farmer of the south and middle west is hardest hit there is a sort of retributive justice. The condition that has come upon us was a danger that was perfectly apparent to any one who has studied that question. I make no claim to be either a prophet or a statesman, but I have given some study to the shipping question. For a decade I have been trying to arouse the Congress and the country to our danger of being without ships to carry our foreign commerce. In a speech made on the floor of the House on Feb. 27, 1907, I used this language:

Excerpt from Speech

The pride, the patriotism, the honor and the safety of the Republic imperatively demand that whatever the cost may be, no power shall drive our flag from the sea.

Our foreign commerce is today almost completely in control of foreign nations. We are almost entirely dependent upon foreign ships to reach foreign markets. Most of the many million dollars' worth of products that go abroad each year must depend on a foreign flag to reach their purchaser. What would be our condition today if one of the leading shipping nations should become involved in war, or, worse still, if two such countries should go to war with each other and should withdraw from our carrying trade, as they would, for war purposes the vessels now engaged

in carrying American commerce? We can get some estimate of what would follow such a war by studying the results of England's contest with the Boers; and, strange as it may seem, the interest first and worst hurt was not the shipper, nor the importer, nor the exporter, nor the manufacturer, but it was the farmer. The farmer discovered then that he was interested in shipping. England withdrew her best ships immediately and substituted old, slower and inferior vessels to carry our trade. Not only were inferior vessels substituted, but freight rates were immediately increased more than 30 per cent. From some ports on the Pacific coast freights were increased more than 150 per cent. On the Pacific the farmers had the price of their wheat reduced 25 cents per bushel, because of the increased price charged for foreign charters. England levied tribute upon the farmers of the Pacific coast to pay the expense of the Boer War. She compelled every farmer in America to contribute for that purpose.

If such damage could come from a war so insignificant, with our policy of each year more and more placing our commerce in the absolute control of foreign ships, what would be the results that would follow in case of a war between England and Germany, or between either of them and another first-class power? Our foreign commerce would be destroyed, our vast over-sea commerce would be paralyzed, our crops would rot unharvested in the fields. Industrially this nation would suffer all the horrors of war. The probability of such a war, of such conditions arising is much greater than is the probability of our ever having any use for the magnificent navy we are constructing. While we most willingly spend millions each year for our navy to protect our commerce, we are unwilling to spend anything to prevent its

destruction by conditions more likely to arise at any time when our navy would be entirely useless. We are willing to spend millions to protect our commerce in time of war, but refuse to spend anything to protect it in the more perilous times of peace.

Cost to Us of the War

And what was the response to this appeal? What was the answer made to those who pointed out the pending danger to our country that is now upon us? The only reply was "subsidy". Yet we have already lost more money that it would have taken to subsidize a merchant marine sufficient to carry our commerce for a quarter of a century, to say nothing of our lost trade and prestige. We are now daily expecting to be called upon to raise a hundred million dollars by war taxes—a war tax brought upon us in times of peace simply because we did not have the intelligence and patriotism to prepare for what could be plainly foreseen. This refusal to do anything for our merchant marine has been principally due to the fact that some gentlemen in order to keep in public place constantly cried out that they were against a "subsidy". If this European war lasts a year, it will cost this nation ten times more than it would have cost us to build up the greatest merchant marine that ever floated and maintain it for half a century. Let it not be forgotten that the only ships that are today under the American flag running across the Atlantic ocean are subsidized ships; that they are running today only because a Republican Congress had the wisdom and patriotism to place upon the statute books the subsidy act of 1891, an act that has been constantly condemned and denounced by those so-called patriots that have opposed our building a merchant marine. But where is the man today who would strike down this subsidy act of 1891? Where is the man in America today who regrets that it is upon our statute books?

If the bill that was filibustered to death in the Senate by two southern Democrats in 1907 had gone upon the statute books we would today have 50 or more great modern steamships

*From the Railway and Marine News, Seattle, Wash.

upon the Atlantic under the American flag. We would have one-half that number or more upon the Pacific. These vessels could have at once brought home all American citizens in Europe. They would have saved this nation millions of dollars already lost in trade. They would be ready to serve us in time of war and we would not be placed in the perilous condition that we are today with our troops in Mexico and our transports being used to bring civilians from Europe back to this country. If this law had gone upon the statute books it would have saved us all this loss, and it would have saved us the humiliation of having advertised to the world our ignorance, our weakness and our neglect. But those who shouted "subsidy" loudest and who posed as great patriots in fighting these bills are now standing before the country as the demonstrated enemies of the nation's best interest and as the unconscious helpers of the great foreign steamship combine that has lived and fattened at the expense of the American people.

I well remember that a distinguished Democrat, then the leader of the Democratic minority in the House, now a member of another body, replied to my plea for a merchant marine in the speech to which I have referred, that it was one of the most eloquent appeals for the American ship owner to get his hand into the national treasury that he had ever heard. This same gentleman today, now that the conditions have come upon us that I predicted would come, is frantic to throw open the doors of the national treasury to help cotton growers of the south. He and his party are willing to spend millions now to secure a lot of foreign second-class ships, built by foreign cheap labor, to relieve them in this emergency, but they were unwilling then to spend anything to secure first-class ships built in American yards by American labor.

For the first time in 25 years the subsidy cry of the demagogue is stilled in the presence of this great national emergency. The Democratic party that has so long denounced subsidy once more repudiates its platform and now passes a bill that contains a direct subsidy provision. Not only does this bill, passed by a Democratic Congress and signed by a Democratic President, propose to pay a direct ship subsidy, but it is proposed to pay this subsidy directly out of the national treasury to foreign built ships. This is a subsidy proposition that the Republican party never advocated.

The Republican party has advocated

a ship subsidy, but only that it be paid to American ships. Of all subsidy provisions that have ever been written upon our statute books this provision of this Democratic law is the most indefensible. They have gone from one extreme to the other. From denouncing the proposal to pay a subsidy to American ships built in American yards they now favor paying a subsidy to foreign-built ships built by foreign cheap labor.

Everything Subsidized Except Shipping

Of all popular cries that ever went up in this country for political purposes only this cry of "subsidy" was the most hypocritical and cowardly. It deceived a great portion of the American people, and this fight against a so-called subsidy was largely created and greatly fostered through that portion of the American press that received a subsidy amounting to millions annually, paid in the shape of advertising by the giant foreign steamship combine. These advertisements were often accompanied by prepared editorials and press notices pointing out the great evil of Americans doing anything to build up our own shipping. These editorials constantly denounced "subsidy", and declared that it was to the great advantage of the American people to have their commerce carried under a foreign flag. Think of the good faith and patriotism of publications of this character taking advertisements and receiving cash for them, and publishing these furnished attacks upon shipping legislation! Talk of being reformers or friends of the people! Think of the good faith and patriotism of the publishers, and especially of the magazines in this country that denounce subsidy, when the publishers in this nation receive a direct subsidy from the national treasury of more than \$63,000,000 each year! This \$63,000,000 is paid to these publishers "to make profitable an unprofitable business". It is paid out of the treasury of the United States by the people directly to these publishers. The periodicals in this nation would want to start a revolution in this country if any other industry was so favored and subsidized as theirs. It is rather a discouraging lesson in patriotism to take up one of these periodicals during the last 10 years and see its great advertisements of foreign steamships for which millions of dollars were paid, and then remember the giving of millions of dollars out of the treasury to keep in circulation these periodicals, and then read on its editorial page an inspired article by these "holier than thou" publishers about the iniquity of the government giving a subsidy to build up our merchant marine.

There never was any sincerity in this "subsidy" cry in practice in Congress or out of it. We subsidize everything in this country except our shipping. We subsidize agriculture more than \$20,000,000 annually. We subsidize mining. We subsidize our rivers and harbors more than \$50,000,000 annually, largely to accommodate foreign ships. We voted a subsidy to kill the cotton-boll weevil, to kill the cattle tick and the gypsy moth and for ten thousand other purposes. We subsidize everything on land and why? Because on land a specific part of every subsidy is spent in somebody's district, or directly benefits some one in some one's district.

For 12 years I have been a member of Congress, and I challenge any man—Democrat, Republican or nondescript—to show that he ever voted against any subsidy of any kind or character, great or small, that was to be expended in his own district. You may search the records in vain and you will find no such exalted individual in either the House or the Senate.

Here is the solution of the opposition to a ship subsidy: No part of it would be expended directly in the district of the man who voted against it. But today conditions have changed and many of these patriotic gentlemen now believe that the money that they would take out of the treasury to secure foreign ships will directly benefit their district, and, of course, they are in favor of it. And those who have formerly denounced it the loudest are now the most clamorous for a bill of this character.

There will be no great American merchant marine built up under a Democratic administration. The Democratic party is irrevocably committed against any remedy that would be effective. The Democratic party is hopelessly committed to that sweet human delusion that you can "get something for nothing". The Democratic party is always wedded to something free. Free ships, free trade, free silver is the trinity of their deluded faith. For years they met every attempt to help American shipping by denouncing it as "subsidy" and declaring that the one thing necessary was free ships.

They waited about an imaginary shipping trust and insisted that if only the American citizen was permitted to go abroad and buy his ships that these foreign-built vessels under the American flag would soon crowd the seas. It was utterly useless to call their attention to the facts. On the floor of the House I called attention to the utter absurdity of such claims. I pointed out that it was not the cost of the ship but the cost of operating the shipping that

had driven the American flag from the sea. At that time I used this language:

"A free ship policy in this country would not be of any effect.

"If the American owner cannot run at a profit the vessel he already owns, certainly the most stupid would not contend that he would buy and run another, however low the purchase price might be."

But, notwithstanding these facts, so plain that none could be deceived, the Democratic party continued to insist that the only remedy was free ships, and they used this argument on every occasion to defeat any bill that would have been of real assistance. Finally a bill was reported from the committee on merchant marine and fisheries, of which I was a member, having a free-ship section. Much to the surprise of many of my Democratic and Republican friends, I favored this provision and declared on the floor of the House that I favored it, because if we adopted it it would demonstrate its utter worthlessness and would put an end to this free-ship propaganda. A free-ship provision was finally enacted into law in the Panama Canal Act. It has been upon the statute books for more than two years. My prediction has proven correct. Not a single ship has taken the American flag as the result of that legislation. The falsity of the free-ship argument has been fully demonstrated, so much so that even the Democratic party no longer uses it.

But even this has not been sufficient to divorce the Democratic party from its policy of delusion and folly of "getting something for nothing". It still advocates the policy of free trade on the seas. They call this policy a "discriminating duty". It was proposed to reduce the duty on goods carried in American ships 5 per cent. Of all the absurd, pathetically ridiculous propositions ever seriously urged in Congress as an efficient remedy to build up an American merchant marine, this proposition stands first.

Absurdity of Free Ships

But as with free ships, it was no use to present facts and figures. So this absurdity was written into the Underwood tariff bill. The history of American legislation furnishes no example of a more indefensible act of Congress. In the first place, we had but few American ships, so the result would have been practically negligible in any event, as the amount was not sufficient to cause an additional American ship to be run or to cause one already running to make an additional voyage. What little influence it would have would be to

open our markets to foreign goods and not foreign markets to our goods. If such provision would have any influence whatever it would be to increase imports and decrease exports. In other words, it was a free trade proposition. What little help it would give was a mere gratuity, a pure subsidy, that went either to vessels already receiving a subsidy from the government or to vessels operated by cheap Chinese crews. To secure this subsidy these favored vessels were not required to perform any service for the government or to give any additional services whatever for the benefit of American commerce.

Greatly in Need of Ships

Of course, between here and South America and between here and the Orient is where we are most greatly in need of American ships. But this free trade provision of the Underwood bill in the trade with these countries would not give sufficient amount to put a "painted ship upon a painted ocean". A large part of our imports from South America and from the Orient is upon the free list. Taking the actual figures from the customhouses, a reduction of 5 per cent of the duty would give the great vessels of the Pacific Mail not more than \$5,000 for each round trip, while the vessels of its Japanese competitor, making exactly the same voyage, receive \$100,000 in gold from the Japanese government for each round trip.

I showed from the reports of the collector of customs from the Puget Sound district that this 5 per cent provision, if the vessel got it all, would give the giant Minnesota, the greatest vessel on all the Pacific ocean, for each round trip of more than 12,000 miles, less than \$2,000, hardly sufficient to pay the salary of the cook, although if this great vessel was subsidized in the same amount as her Japanese competitors she would receive about \$150,000 each round trip.

The figures from the treasury department show that this reduction of 5 per cent, as proposed by the Underwood bill, if the vessels received the entire 5 per cent, would not be sufficient, as I stated when discussing the proposition here on the floor of the House, to run a line of Indian canoes between here and South America.

Under the provision of the Underwood law, a tramp vessel coming from Europe to this country would receive greater compensation for carrying a single case of champagne than a modern ocean liner would receive for bringing \$5,000,000 worth

of rubber, or hides, or coffee, or meat from the distant coast of South America. No words can demonstrate the utter absurdity of this provision of the present tariff law as do the government official figures that I have placed in the Record.

But nothing could convince the Democrats that they could not "get something for nothing". They had to try this provision as they had to try free ships before they were satisfied. But even now I understand that some of the worshippers of free trade are not entirely cured of their delusion as applied to our merchant marine.

It has been repeatedly declared that the 5 per cent discriminating duty provision in the Underwood law is the plan followed by "our fathers"—under which we once had a merchant marine that was the glory of the seas and the pride of the American nation. Nothing could possibly be further from the facts. The plan of our fathers was to increase the duty on goods carried in foreign ships. The plan of the Underwood bill is to decrease the duty on goods carried in American ships. The plan of the fathers affected all imports alike, whether dutiable or free. The Democratic law affects only goods that are dutiable. The plan of our fathers was protection. The plan of Democracy is free trade. The plan of our fathers was effective. The plan of Democracy is ridiculous.

The plan of our fathers suited their time. It was effective and it showed their wisdom and their patriotism, but in this modern world of commerce the plan of our fathers would be as antiquated as would their ancient flint-lock rifles with which they gained their liberty, in a war today against modern weapons.

Only Remedy Left Democracy

The Democratic party has forever pledged itself against direct aid to shipping and against any increase of duty on imports. There is but one other way left, and that remedy the decadent democracy of Jefferson and Jackson are already claiming is the only remedy, and that is the socialistic remedy of the government buying, owning and operating its own vessels. Six months ago I made the prediction that before the end of this administration the Democratic party would be insisting on the government buying and operating ships as a way to get a merchant marine. There could be no doubt that they would do this if they did anything, for it was the only method left open to them.

This socialistic proposition is al-

ready with us. The European war demonstrated the result of our folly. We were reaping our reward. A demand came for American ships. This time the cry did not come from the shipper of the Atlantic and Pacific coasts; it did not come from the American manufacturer. Cotton was hit. All cry of "subsidy" and "graft" and "special interest" died suddenly upon the lips of Democracy. There was a frenzied and hysterical demand that the treasury be thrown open and that the government, regardless of cost, must come to the relief of the cotton planter. The very men that had for years blocked every attempt to prepare for such an emergency were now the ones most frantic for "subsidy". These excited gentlemen are still so feverish and hysterical that they do not even yet see the inconsistency of their present attitude or realize their responsibility in bringing upon the country our present deplorable but inexcusable condition.

At present it appears that the plan the Democratic party will finally follow will be government ownership, with all the extravagance, incompetency, corruption and scandal that such plan must bring.

Those who have long been abusing subsidy the loudest are now loudest in their demand for this socialistic proposition. They no longer care who makes a profit or who pays the expense so long as their constituents get immediate relief.

The Recent Law

The bill just passed may bring some temporary relief, but it will not be of any permanent benefit unless it is followed by other legislation. As soon as the war is over the foreign cheap ship, with its foreign crew, subsidized by its government, will soon force all the vessels that take advantage of the present law again under a foreign flag. So transparent and plain is this proposition that most of the ships we are purchasing in good faith will be bought with this very purpose in view. It is the only possible way that the purchaser of a ship can have any reasonable hope of a profitable return upon his investment. It is argued that there are already many ships under foreign flags that are owned by Americans, and that these ships under the present law will seek American registry. This they may do, but it will probably be because they wish to be protected from seizure by foreign nations. But even if this class of vessels does come under the American flag, it will do but little toward relieving the present situation, because they will continue in the same trade where they

now run. Take, for illustration, the United Fruit Co. vessels, now under the English flag. They may take the American flag. It will protect them from any danger of seizure by German warships, but these vessels will undoubtedly continue to run in the same business in which they are now running.

Folly of Buying Ships

If the government should go into the business of buying and running ships, then the present law would be of little or no benefit whatever, for it is hardly to be supposed that any American citizen in good faith would buy vessels and undertake to run them in competition with the government, with the United States treasury back of the scheme to meet the loss that would occur.

I see no hope of any merchant marine as long as the Democratic party controls the country, for they stand where they have always stood—absolutely opposed to anything that will permanently build up American shipping. Repeating a statement I made upon the floor of the House many years ago when arguing this same question:

"It is useless to attempt to persuade them to see the error of their way. The Democratic party is for free trade. It is wedded to a corpse; it never unites with the living. When you attempt to convert the Democratic party, when you attempt to persuade it to favor any proposition that is right, to vote for any policy that is for the general good, in the language of Holy Writ, 'You might just as well fill your belly with the east wind.' 'Yea, they have chosen their own ways, and their souls delight in their abominations'."

Our financial loss by this war in Europe because of our being without a merchant marine can never be measured. It is beyond human calculation. But vast as it is, by comparison it is as nothing to what we would lose by having no merchant marine if we were to become involved in war with some powerful nation. We have practically no transports for our army and practically no auxiliary for our navy. If we were at war today, we could with greatest difficulty, notwithstanding the Panama canal is now open, because of our lack of American ships, get our battleship squadron from the Atlantic to the Pacific ocean. If our battleship squadron were there it could only fight along the shore. It could only be used as a mere coast defense, because of lack of merchant ships to support it.

When our battleship squadron went

around the world it could only do so because we employed foreign ships to carry the coal, a thing we could not do in time of war. Had war been declared while that trip was being made, all these foreign ships would immediately have left our service, and the best that we could have done would have been to run our mighty battleship squadron into a neutral port and there dismantled the vessels and abandoned them until the end of the war. Our condition is little better today. Now we have but few transports, and most of these are old and antiquated and utterly unfit for overseas voyages. With a few of these transports sent to Europe to bring home stranded Americans, our army at Vera Cruz is now practically helpless. We have no vessels left to either send them reinforcements or to bring them away.

If war were declared today, we could not get 25,000 soldiers to the Philippines in a year if the fate of the Nation depended upon it.

Navy Worthless

A navy is practically worthless without a merchant marine. We build a navy for the protection of our country. A merchant marine is an essential for the common defence as a navy. Why should it not be the business of the Nation to provide the one the same as the other? They are both for one and the same purpose. The best and most economical method yet devised to provide a naval auxiliary is by government aid to private lines to build a navy without a merchant marine as an auxiliary is an inexcusable waste of public money. To build a navy and not a merchant marine is criminal stupidity that may any day threaten the integrity of the Republic.

At the annual meeting of the New York State Waterways Association held at Rochester, N. Y., the following officers were re-elected: Henry W. Hill, Buffalo, president; John D. Kerman, Utica, first vice president; Henry A. Meyer, Brooklyn, second vice president; George H. Cobb, Watertown, third vice president; T. P. Kingsford, Oswego, fourth vice president; Olin J. Stephens, New York City, treasurer; Frank S. Ellsworth, Rochester, secretary.

Smith & McCoy, Norfolk, Va., recently completed a floating dock which added to their former dock gives it a length of 250 feet on keel of blocks, capable of docking a vessel 250 feet long and of 3,000 gross tons. The dock was designed by Wm. T. Donnelly, 17 Battery Place, New York.

Isherwood System of Construction

Showing Certain Details of the Transverse and Longitudinal Systems

By Robert Curr

Fig. 1 with this article shows a seven-frame space section of transverse framed vessel.

Fig. 2 shows the Isherwood section with the plating above the bilge removed.

This section is 12 feet 8 $\frac{3}{4}$ inches long above the tank, but in the tank the transverses are only half that distance apart.

Fig. 3 shows the cross section cut off at the water line which is 13 feet 9 inches above the underside of the keel plate.

The half girth of this section is 32 feet, making a surface of 408 square feet on one side of the vessel.

The half girth is divided in three parts, 10, 7 and 15 feet, and the centers of same are 5, 13 and 13.5 feet below the water line, Fig. 3.

The water pressure on this section is as follows:

$$\begin{array}{r} 12.75 \times 10 \times 62.5 \times 5 = 39843.75 \\ 12.75 \times 7 \times 62.5 \times 13 = 72975.63 \\ 12.75 \times 15 \times 62.5 \times 15 = 151367.18 \\ \hline 263786.56 \\ \hline 2 \end{array}$$

Pressure upon both sides 527573.12 pounds.

The safe load on the longitudinal frames and two transverses amounts to 800,000 pounds.

The shell plating is not included in this calculation and the result appears very much in favor of the Isherwood idea.

Comparing Figs. 1 and 2 the Isherwood section would appear the most natural and efficient in resisting buck-

*This is the seventeenth of a series of articles on the Isherwood system of construction which began in the September, 1912, issue of The Marine Review. The first article dealt with the general specifications of the steamer; the second with the sheet, half-breadth and body plans; the third explained the method of getting the sheer; the fourth dealt with the longitudinal and transverse framing; the fifth with offsets; the sixth with the shell plating; the seventh with the shell plating expansion; the eighth with the arrangement of plates and angles forming the spar deck; the ninth with the transverses; the tenth with bulk head construction; the eleventh with the connection of longitudinal frames to the bulkheads and transverses; the twelfth showed the interior framing between the tank top and spar deck; the thirteenth showed the amount of work that can be put together in a Great Lakes ship yard in a few hours; the fourteenth showed details of riveting in shifts of butts; the fifteenth considered the subject of butt straps and laps; the sixteenth discussed Lloyd's rules and their application.

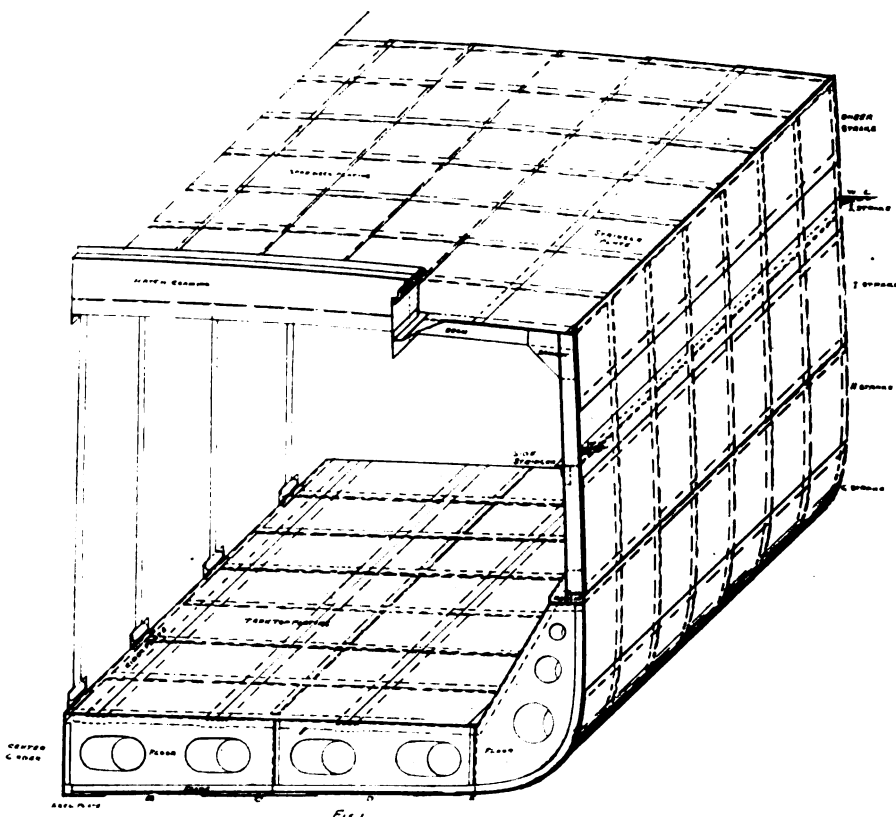


FIG. 1

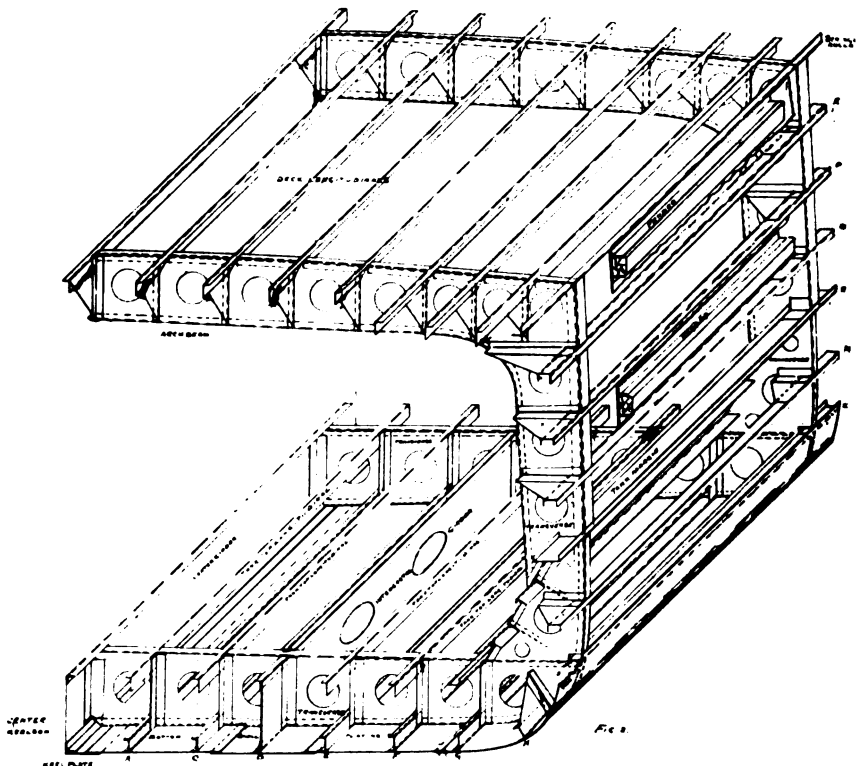


FIG. 2

ling of plating in the case of ground-
ing and colliding.

It is found after docking transverse
framed vessels which have grounded
the plating between the frames is cor-
rugated and the same thing happens
when they strike sidewise or stem on.

The folds and furrows on the plat-
ing would not be helpful to the plat-
ing when the vessel was under hog-
ging strains which would have a ten-
dency to collapse.

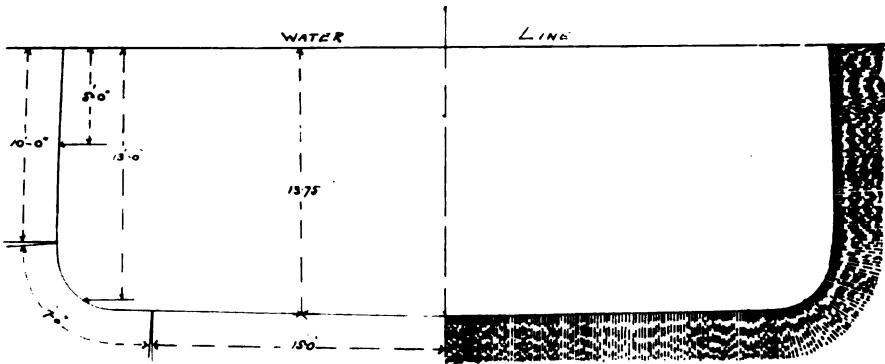
The longitudinal framing changes
the unsupported outside plating from
transverse and vertical directions to
lengthwise and has proved satisfac-
tory in preventing corrugations in the
bottom and side plating.

Isherwood ships can be repaired
cheaper and quicker than the trans-
verse framed vessel and the bottoms
easier accessible, as seen by Fig. 2.

The beam brackets and the bracket
plates connecting the bottom of the
frames to the tank margin as well as
the liners between the outside strakes
of plates, keel, C, E, G, I, and sheer,
shown on Fig. 1, are dispensed with
on the Isherwood vessels.

The liners between the outside
strakes of shell plating and frames
have always been troublesome and
increased the weight of the vessel as
well.

To dispense with the liner the out-
side shell plates were joggled on the
edges but it decreased the displace-
ment and instead the frames were



joggled inway of the seams of the
outside plating.

The longitudinal framing dispenses
with all this work excepting a few
pieces on the transverses which may
come on a lap.

In the last article reference was
made to the over or under weights
of plating and should read 2½ per
cent instead of 21½ per cent.

Admitted to American Register

The bureau of navigation reports 83
sailing steam and unrigged vessels of
17,184 gross tons, built in the United
States during September. Of this num-
ber sixty were steam vessels of 12,857
gross tons of which the Medina of
5,426 gross tons built by the Newport
News Ship Building & Dry Dock Co.

Rig.	Name of vessel.	Gross.	Where built.
St. s.	C. A. Canfield.....	6,350	Newcastle-on-Tyne, England
St. s.	Crofton Hall	5,773	Port Glasgow, Scotland
St. s.	Santa Rosalia	5,409	Port Glasgow, Scotland
St. s.	Sixaola	5,017	Belfast, Ireland
St. s.	Tivives	5,017	Belfast, Ireland
St. s.	Zacapa	5,012	Belfast, Ireland
St. s.	Metapan	5,011	Belfast, Ireland
St. s.	Almirante	5,010	Belfast, Ireland
St. s.	Atenas	4,952	Belfast, Ireland
St. s.	Abangarez	4,954	Belfast, Ireland
St. s.	Turrialba	4,952	Belfast, Ireland
St. s.	Heredia	4,943	Belfast, Ireland
St. s.	Cartago	4,937	Belfast, Ireland
St. s.	Parissima	4,937	Belfast, Ireland
St. s.	Kentra	4,682	Port Glasgow, Scotland
St. s.	Norman Bridge	4,289	Newcastle-on-Tyne, England
St. s.	Bantu	4,188	Wallsend-on-Tyne, England
St. s.	Brindilla	4,170	Bredow (near Stettin), Germany
St. s.	Caloria	4,096	Newcastle-on-Tyne, England
St. s.	Platuria	3,445	Low Walker-on-Tyne, England
St. s.	Esparta	3,297	Belfast, Ireland
St. s.	Limon	3,297	Belfast, Ireland
St. s.	San Jose	3,296	Belfast, Ireland
St. s.	Coppenname	3,191	Belfast, Ireland
St. s.	Brabant	2,773	Newcastle-on-Tyne, England
St. s.	Montano	2,730	Newcastle-on-Tyne, England
Bkn.	Everett G. Griggs.....	2,577	Belfast, Ireland
St. s.	Panuco	2,556	Walker-on-Tyne, England
St. s.	Pinar Del Rio.....	2,504	South Shields, England
St. s.	Trinidadian	2,450	Newcastle, England
Bk.	Annie M. Reid.....	2,165	Glasgow, Scotland
Shp.	Hilston	2,087	Greenock, Scotland
Sch.	Louise N. Richard.....	441	Port Greville, N. S.
Sch.	C. W. Mills	371	Granville, N. S.
Sch.	Roseway	291	Shelburne, N. S.

for the Mallory Steamship Co. was the
largest.

From other sources than construction
thirty-five vessels of 131,180 gross tons
were added to the merchant fleet, being

tons, of which 252 were steam vessels
of 62,899 gross tons.

The work of transforming the Phila-
delphia navy yard at League Island
from a repair station into a shipbuilding
yard was begun on Sept. 21. Secretary
of the Navy Daniels broke ground for
the new \$200,000 shipways in the pres-

ence of over a thousand persons, among
them being several hundred members of
the South Philadelphia Business Men's
Association, who celebrated the exten-
sion of the yard's activities with a
luncheon in the new barracks. It is
stated that more than 700 men will be
employed on the work.

The Bureau of Yards and Docks is
advertising for proposals for shipbuild-
ing cranes for the Boston and Philadel-
phia navy yards and for a 150-ton float-
ing revolving crane for the Norfolk
navy yard. Detailed information con-
cerning these contracts may be obtained
from the Bureau of Yards and Docks
or the commandants of the navy yards
named.

The Atlantic Deep Waterways As-
sociation recently re-elected Congress-
man J. Hampton Moore, of Philadel-
phia as president; Wm. H. Schoff, of
Philadelphia, secretary-treasurer, and
Durell Shuster, of Philadelphia, as-
sistant secretary-treasurer.

J. H. Robinette, treasurer, and C.
A. West, auditor, of the Merchants'
& Miners' Transportation Co., re-
signed recently, their successors being
Walter Wadsworth and Thomas W.
Kennedy, respectively.

Kapok Aboard Ship

The Navy Department is Making Extensive Use of This Fiber for Mattresses, Pillows and Cushions—Its Life Preserving Qualities

By F. C. Coburn, Naval Constructor, U. S. N

THOUSANDS of lives have been lost at sea; but the average man, in planning his trip abroad, reasons that *his* life will not be in danger. So it seems, at any rate; for there is very little being said about the peril of the sea.

Perhaps the truth of the matter is that the traveling public thinks about it very little, if at all. The idea of insuring safety never has appealed strongly to the public mind, and as the percentage of casualties at sea is very low, and the ships look big and strong, the average man does not worry about it.

The fact is, however, that the peril of the sea is still with us; travel by water is not safe; ships do look big and strong, but the ocean is bigger and stronger; wind, fire, fog, high speed, and carelessness will continue to cause shipwrecks; and, in case of shipwreck, it is exceptional when all lives are saved. Even if the percentage of loss is comparatively low, there is a loss, and nobody wants to be reported in the list of missing. Hence, it behooves the public to think about it.

There was the General Slocum disaster, for example; 955 lives lost out of a total passenger list of 1,358. And the Titanic disaster; the passengers on that ill-fated ship entrusted themselves to the tender mercies of the deep, without investigating to see what would happen to them in case of shipwreck. Passenger steamers are still in the trans-Atlantic service; they are not unsinkable; and in event of great disaster it would be next to impossible to take all hands off in boats promptly. What happens to the rest?

The slogan "Safety First", that is being shouted in railroad and factory circles, has not been heard yet in shipping circles—not distinctly. Competition on the high seas is very keen, indeed; ship owners are not in the business for simple enjoyment, and so they must figure closely on the capital cost of their ships, and not put in too much non-revenue-producing investment. The internal arrangement of the ship must be such as to give ample cargo and passenger space, so that she can carry a big load; and the arrangement must also



LIEUT. S. P. EDMONDS

be such that cargo can be handled expeditiously so that the ship may not be held in port too long. He must make his ship pay.

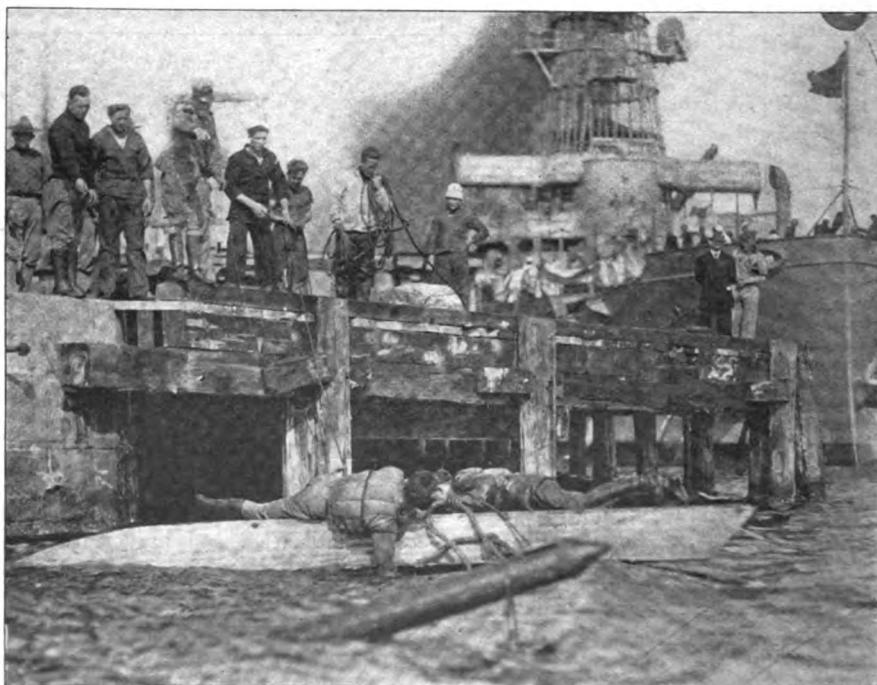
As to the safety of ships, something is being done. There was held in London a year ago an International

Conference on Safety of Life at Sea, to which came delegates from all the major ship-owning and ship-building nations. These were delegates plenipotentiary and had commissions under their governments' seals, as would any ambassadors. They agreed upon a convention, very comprehensive in its scope and very thorough, as there was a large representation of naval architects. That convention, like any other treaty, must be submitted to the various governments for ratification, and, if ratified by our Senate, then, the Congress will be under obligation to pass legislation putting it into effect. Let us hope that this comes to pass, for it will go a long way toward improving the traveler's safety.

Even the ships built under that convention will not be perfectly unsinkable; and there will be thousands of the older ships still in business. Might it not be well for the average man to know something about the risk he takes in going to sea?

The problem today, in case of shipwreck or fire at sea, involving abandonment of the ship, is to keep the passengers and crew afloat and alive until picked up.

In days gone by, the problem was



NAVY AVIATORS WEARING KAPOK LIFE PRESERVERS AT WORK ON A WRECKED AIR PLANE



KAPOK PODS BEING OPENED

different, and more difficult of solution; it was frequently necessary not only to keep passengers and crew afloat, and alive, but also to transport them some distance to dry land; and even if picked up at sea, the elapsed time afloat was, as a rule, much longer than it need be now.

The reasons for this change in conditions are two; the increase in number of ships on the seas, and the wireless telegraph installations they carry. The greater of these is the latter; radio service is one of the greatest life-saving devices the world has known. Ever since the wreck of the Republic it has figured conspicuously in maritime disasters—in some cases because it was not used, as, for example, in the case of the Nantucket-Monroe collision, which could have been avoided had the wireless installations on the two ships been used.

The greatest part of passenger traffic at sea is over well-traveled routes; where the S O S call, followed by name and position, will bring succor within a few hours. This condition should not, of course, operate to relieve ship-owners of the necessity of building ships as safe as practicable, and of navigating them so as to avoid risk, at all times; but when all precautions have failed, and shipwreck does occur, the problem of temporary support afloat and eventual rescue can be taken care of more easily than in the olden times.

If the reader will but recall the sea tales of his early library, with their soul-rending accounts of long journeys after shipwreck; the long-boat, the gig, the whale-boat, were familiar terms, and so were the breakers of

water, and the tins of biscuit. The boats, we read, had compasses, and sails, and one of the officers usually had a sextant. The yarns were pretty well standardized; only occasionally a real variation was turned out—like the one of the Casting Away of Mrs. Lecks and Mrs. Aleshine. However harrowing any of those old tales are, they do not fully state the truth, it is only fair to say.

But, nowadays, newspapers tell of ship-wreck followed in a few hours, or perhaps days, by rescue of those who were kept afloat; and the fiction of today reflects this change.

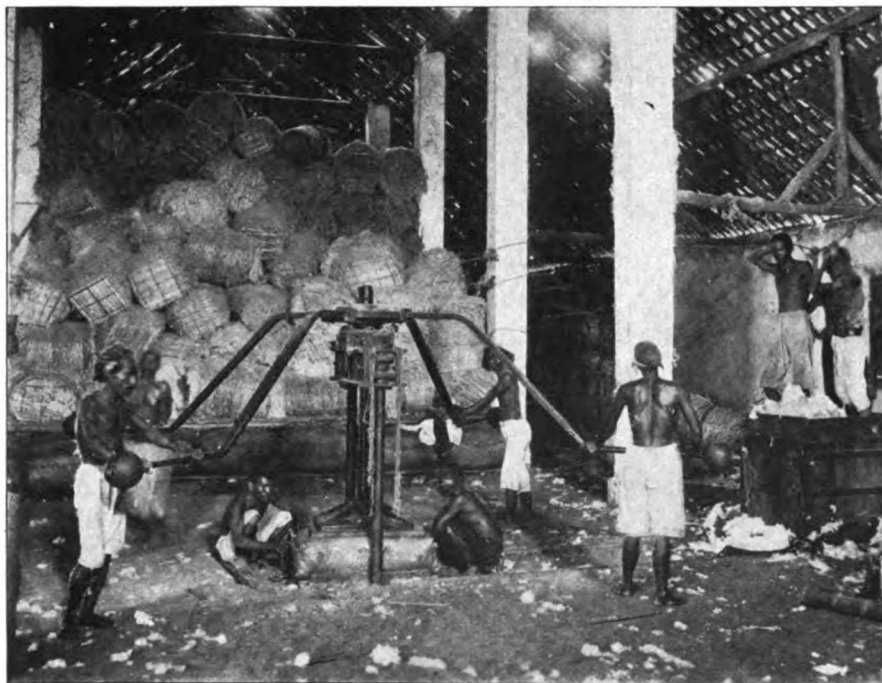
It is not the purpose here to tell of life boats, and life rafts, and the wireless, and why ships go too fast in the fog, and why all the rocks seem to be uncharted, and why cargoes "catch afire"; but to tell of a material which is bound to come into use and help to keep passengers afloat—and alive. It is not a new material, nor an invention; it has been known for many years; but not very many people knew about it, and those few knew very little about it—especially about its value as a life-saver at sea; it once was administered a very black eye, through no fault of its own, and it has not since been seen in public very much.

This material is kapok, a vegetable fiber. It is found in the seed pods of the kapok tree, which is known to the botanists as *Ceiba Pentrandra*, or *Eriadendron anfractuosum*, of the silk-cotton family, *Bombaceae*, growing in tropical countries—the East and West Indies, Central America, India, and the Philippines. The pods are 5 or 6 inches long, filled with this silky fiber, in which are embedded the seeds—hard, round pellets, the size of a pea.

In the East Indies, in Java particularly, and in the Philippine Islands, the best kapok is grown; it has the finest silky fiber, is whiter and nicer looking, and is the only life-saving kapok we have. It is impregnated with a vegetable oil, so that it does not itself absorb water readily; and a mass of the kapok fibers will keep water out because of the surface tension of the water itself; the fibers are so small, and so close together, that the water, closing in on the air inside the mass of kapok, presents to the



RAW KAPOK DRYING IN THE SUN AND BEING BEATEN WITH LIGHT BAMBOO STICKS



PRESSING KAPOK IN SINGLE BALES FOR SHIPMENT. THESE BALES MADE UP INTO LIFE PRESERVERS WILL SUPPORT 250 MEN

air a myriad of little surfaces, on each of which the surface tension is great enough to withstand the pressure of the air; and the air keeps the mass afloat. Kapok will support in water *twenty times its own weight*; in leather or imitation leather cushions it will support this weight for *three months*; and, in ordinary mattress ticking, long enough for a person to die of thirst and hunger. A mattress stuffed with kapok will support a passenger until rescued, if the passenger does not die of thirst and hunger; and as rescue comes pretty quickly in these modern times, the kapok mattress looks like a valuable adjunct to the sea-going ship's equipment.

Stuffing for Life Preservers

As a stuffing for life preservers it cannot be excelled; it is much lighter than cork, and whilst bulky, is very compressible, so that the life preserver can be compacted into small compass for stowage. And, by proper choice of construction of the life preserver, it can be made superior to the cork belt.

Kapok has been used for many years for stuffing mattresses, pillows and cushions, being known as "silk floss"; it is quite commonly in use as a stuffing for boat cushions, and some of these are guaranteed as to buoyancy by their makers. This silk floss is quite frequently adulterated with cotton, especially for cheap mattresses, and only a small part of all the silk floss is Java or Philippine kapok. So that all silk floss is not kapok and not all kapok is suitable for life-saving, wherefore it becomes necessary to find a

means for distinguishing between kapoks. This it is not easy to do. All kapoks look alike and feel the same, except some of the very low grades, such as the dark India kapok; and when well cleaned and "fluffed up" after long travel across the ocean in bales, there is but little choice between them as to appearance. But when tested as to buoyancy, the differences appear; this is the acid test for kapok, and is the one on which the Navy Department relies when purchasing kapok for its uses.

The Navy Department is now using

kapok quite extensively. The Department began to experiment with it about three years ago, somewhat cautiously at first, but its excellent qualities were finally established. For submarines the pillow type is used exclusively. All hammock mattresses for sailormen are now made of kapok. That makes the sailorman's hammock his own life preserver and will eventually result in cutting down the number of life preservers on a battleship. A considerable portion of the mattresses of the officers' bunks are now made of kapok. They are better than hair mattresses, much cheaper, are more sanitary and are very comfortable. Sickbay mattresses are also being made of kapok. Kapok mattresses have been very generally tested by the Navy Department. One of them was loaded with 200 pounds of cast iron grate bars, and the ship making the test reported that at the end of eight hours the mattress had sunk so far that the top was just awash. Such an outfit would have saved practically all of the lives lost when the Titanic sunk.

The black eye which kapok has been burdened with was sustained after the terrible General Slocum disaster; that sad affair blackened many a reputation. The burning of the General Slocum, it will be remembered, occurred on June 16, 1904, in New York Harbor; there were 1,388 passengers and crew on board, 745 of whom were children; and of the total number only 401 were saved.

The President of the United States appointed a Commission to investigate this disaster, and this Commission found that the Slocum had not been



KAPOK HAND CLEANING. IT IS SO LIGHT AND FLUFFY THAT THE TOP OF THE SPACE MUST BE SCREENED

properly inspected by the local United States Steamboat Inspectors. So they ordered a reinspection of all steamers in New York harbor, by steamboat inspectors from other ports; and during this reinspection the Commission found a large number of kapok life preservers of insufficient buoyancy. The Steamboat Inspection Service had approved kapok life preservers in 1902, and all these defective belts had been inspected and stamped by members of this Service. This stampeded the Board of Supervising Inspectors, and since then, the kapok life preserver has been taboo.

Steamboat Inspection Service

The Commission in its report—which, by the way, is excellent reading for those given to the steamboat excursion habit—made two very significant statements, which very concisely summed up the situation; first, that “kapok itself is a material about which little is known”, and second, about the factory test of kapok life preservers, that “the inspector making the test, being wholly unfamiliar with the peculiarities of kapok, failed to leave it submerged long enough to note its absorbent qualities . . .”

The Steamboat Inspection Service thereupon prohibited kapok life preservers, and they have disappeared from our ships; as matters stand today, the traveling public is deprived of a wonderful life-saving medium.

Some good work is being done along this line. Just after the Titanic disaster, Lieut. S. P. Edmonds, U. S. Revenue Cutter Service, Retired, on the staff of one of the prominent periodicals in the south, prepared an editorial dealing with the lack of life-saving appliances; and putting forth the proposition that every passenger's bunk mattress should be not only a comfortable mattress, but an efficient life raft. The editorial was not published, as it seemed too fantastic; but Lieut. Edmonds, to vindicate himself, so to speak, set about realizing his dream. He found kapok, and learned its history. He improved the ordinary kapok mattress by putting a pipe frame around it, so that one can sit on its side with one's feet in the water, and it will not double up. It is a wonderfully efficient raft, and as a mattress is more comfortable than the usual hotel or steamship mattress! The ordinary kapok mattress as put on naval vessels has no pipe frame, but has the same buoyancy, and is less awkward to handle, in getting overboard with it; but a woman would be ill at ease on it, to put it mildly—if it will double up.

But, more than this, Lieutenant Edmonds has come to the aid of the children.



THIS LOAD OF KAPOK WEIGHS
10 POUNDS



MAKES A COMFORTABLE BED



THIS RAFT WILL FLOAT FOR WEEKS

Lieut. Edmonds has shown a way to take care of the child's life by providing a flat, long pad, with a hole in the middle of it for the child's head, the parts of the pad being drawn down, one in front, the other behind, and held there by tape straps. Thus the buoyancy is all around the neck and shoulders, holding the child erect—and with the head nearly a foot out of water.

The flat kapok life preserver doubles up and makes a good pillow. The kapok mattress, with or without the pipe frame is an efficient life raft and a very comfortable bed. It is clean, light, sanitary, and will not get lumpy and hard; and is vermin proof. The sailor man's kapok hammock mattress makes his hammock his life preserver. There are coats and waistcoats on the market padded with kapok, which are fine for the sailorman or yachtsman; they are light, not bulky, and are warm and comfortable, and will save the wearer's life.

The aim now must be to get the life-saving kapok garments, mattresses and life preservers aboard ships, and the first step must be the approval of kapok by the Steamboat Inspection Service. The Board of Supervising Inspectors has had kapok under consideration again; they probably will not approve it until they are satisfied that it is practicable to tell the difference between buoyant kapok and absorbent kapok, and as the Navy Department is actually doing it now, the Steamboat Inspectors can certainly learn to do it—or get the Navy Department to do it for them.

Then, if kapok mattresses will be acceptable as applying under the life raft requirements, the ship owner will doubtless be glad to equip with them, because he will not have to provide life rafts in, addition, will save their weight and space, and do it all while paying for the mattresses.

This is not a mere dream, not a fantastic speculation; these kapok-stuffed mattresses are wonderfully buoyant. They will support all the people who can hold onto them, and a two hundred-pound man can ride around on one for a day or two without getting wet. Had the Titanic been equipped with kapok mattresses, all hands could have been saved; those for whom there was no room in the boats could have floated about, each on his own little raft until picked up, wrapped in steamer rugs and clear of that freezing cold water.

Suppose we think of these things for a time. Suppose that public opinion should demand the application of this wonderful kapok to life-saving appliances; that Lieut. Edmonds' ef-

forts to save the women and children be backed up; that passengers learn where the life boats and life preserv-

ers are, before hunting for the bar and grill room; that everyone learn how to use the cork life belt—a valuable,

reliable friend if used properly.

Does it not pay to think a little about the safety of our own lives?

Naval Warfare

German Submarines Have Made Some Notable Raids— Carmania Sinks the Cap Trafalgar—Britain's War Spirit

GERMANY has achieved some notable successes in naval warfare during the past month, the most notable of which is the sinking of the three British cruisers of the Cressy class—Aboukir, Cressy and Hogue. This class was some time ago superseded, yet nevertheless they were sizeable ships of 12,000 tons each. If, as is generally believed, they were sunk by a single submarine the exploit is one that naval strategists of all countries will regard as a triumph. The British government took the loss quite simply, issuing a statement to the effect that two of the cruisers were undoubtedly sunk in going to the relief of the first that was struck, and that while their motives could not be questioned they had nevertheless made a great military blunder. Should such a maneuver again be attempted the British do not intend that their vessels shall be made targets. The stricken ship will be left to care for itself.

The German cruiser Emden has also succeeded in sinking a number of British merchant ships and has so far successfully eluded pursuit, though there are no less than 24 British cruisers searching the seas for the five German cruisers known to be at large. The achievements of the Emden have been quite notable, as she is operating far from any base of supplies and must be exercising great ingenuity in coaling. All of the merchant ships that have fallen victims to her speak in terms of the highest praise of her commander.

So far there has only been one open fight on the high seas and that was between the German auxiliary cruiser Cap Trafalgar, formerly of the Hamburg-South American Line, and the British auxiliary cruiser Carmania, formerly of the Cunard Line. The Cap Trafalgar went into commission last March in the Hamburg-South American trade and was one of the finest steamers afloat. Both vessels were about equally armed and after two hours of fighting the Cap Trafalgar turned turtle and sank. That she should have turned on her beam's end rather than have sunk in a fore or aft direction has raised some doubt as to

her stability; but it is regretted in British circles that she sank at all as she would have made a splendid prize.

Altogether since the war began the British have lost eight vessels and the Germans 26. Meanwhile Winston Churchill, first lord of the British Admiralty, has announced that Britain is building twice as many battleships and four times as many battle cruisers as Germany and will have them in commission within a year.

The most wonderful spirit is being manifested throughout Great Britain towards the prosecution of the war. Not only is the government paying a stated sum weekly to the families of those who have joined the colors, but their employers are continuing them on the pay-roll at half pay and have promised to retain their places for them or to provide them with positions equally as good when they return. Moreover, they will not fill their places with men who are under 35 years and even then not unless they can bring a certificate that they are physically unfit for military service. Following are some detached paragraphs from *The Engineer* of London in respect to this:

* * *

We are informed that, up to date, 118 men from the works and offices of the Westinghouse Brake company, Ltd., representing upwards of 28 per cent of the company's normal establishment, have joined the colors. The Westinghouse Brake Company, Limited, is paying these men half rate wages, and has agreed that all who return to them on the expiration of such service shall find their places open for them.

* * *

The navy and army reservists and territorials who have joined the colors from the Great Western Railway number over 4,000. There are 1,775 from the locomotive, 721 from the goods, 617 from the engineering, 566 from the traffic, and 158 from the signal departments. The general manager has announced that the posts hitherto filled by the men will, as far as possible, be kept for them on their return to civil life, and if the identical positions are not available, others will be found. The company will make good at its own expense the men's contributions to

the pension, society and widows' and orphans' fund, and arrangements will be made to see that the men's respective families do not suffer financially by their absence.

* * *

The members of the staff and works of the British Thomson-Houston Co., electrical engineers and manufacturers, Rugby, with branch works at Willesden and Coventry, are answering the call of their country in a whole-hearted manner. So keen is the patriotism of their employees that up to the present 900 have answered the call. The above number represents over 50 per cent of all employees within the eligible age limit. It is the company's intention to pay half wages to those of its employees who have enlisted. The company further promises wherever possible to reinstate returning employees in their former position on the cessation of hostilities. In those positions where fresh help has to be employed to keep the works going, no male candidates will be considered who are not over 35 years of age or who cannot give proof by showing H. M. S. certificate that they are medically unfit to enlist. Reserve and territorial officers on the staff of the company have rejoined their respective units in the Navy, Lancashire Fusiliers and the King's Horse, and it is noteworthy that one of the officers not being able to obtain his former commission has volunteered as a gunner in a howitzer battery.

* * *

Within a few weeks of war being declared, over 20 per cent of the total male office and works staff of Williams & Robinsin, Limited, irrespective of age joined the service, a record the firm has every reason to be proud of. Lord Kitchener has conveyed in a letter to the firm his special thanks. It may be added that places are being kept open and half-pay rates paid for those who have joined the colors. The company has always maintained a close connection with the army, and contributed largely to the formation and support of a howitzer battery formed some years since, and whose headquarters adjoin the works.

Meanwhile the British ministry are acquainting the British people with the cause and progress of the war in speeches that recall the impassioned eloquence of Edmund Burke and vividly reveal the wonderful resourcefulness of the English language for the expression of thought. Mr. Asquith, the premier, said:

"But let me ask you, and through you the world outside, what would have been our condition as a nation today if we had been base enough, through timidity or through a perverted calculation of self-interest, or through a paralysis of the sense of honor and duty, to be false to our word and faithless to our friends? Our eyes would have been turned at this moment with those of the whole civilized world to Belgium—a small state which has lived for more than 70 years under a special and collective guarantee, to which we, in common with Prussia and Austria, were parties—and we should have seen, at the instance and by the action of two of these guaranteeing powers, her neutrality violated, her independence strangled, her territory made use of as affording the easiest and most convenient road to a war of unprovoked aggression against France. We, the British people, should at this moment have been standing by with folded arms and with such countenance as we could command, while this small and unprotected state, in defence of her vital liberties, made a heroic stand against overweening and overwhelming force. We should have been watching as detached spectators the siege of Liege, the steady and manful resistance of a small army, the occupation of the capital, with its splendid traditions and memories, the gradual forcing back of the patriotic defenders of their native land to the ramparts of Antwerp, countless outrages suffered by, and buccaneering levies exacted from, the unoffending civil population, and finally the greatest crime committed against civilization and culture since the Thirty Years' War—the sack of Louvain. With its buildings, its pictures, its unique library, its unrivalled associations, a shameless holocaust of irreparable treasures lit up by blind barbarian vengeance.

"What account should we, the government and the people of this country, have been able to render to the tribunal of our national conscience and sense of honor in defiance of our plighted and solemn obligations we had not done our best to prevent, yes, and to avenge, these intolerable wrongs?

"For my part, I say that sooner than be a silent witness, which means in effect a willing accomplice of this tragic triumph of force over law and

of brutality over freedom, I would see this country of ours blotted out of the page of history.

"That is only a phase, a lurid and illuminating phase, in the contest into which we have been called by the mandate of duty and of honor to bear our part. The cynical violation of the neutrality of Belgium was after all but a step, the first step, in a deliberate policy of which, if not the immediate, the ultimate and not far distant aim was to crush the independence and the autonomy of the free states of Europe. First Belgium, then Holland and Switzerland—countries like our own imbued and sustained with the spirit of liberty—we were one after the other to be bent to the yoke, and these ambitions were fed and fostered by a body of new doctrines and new philosophy preached by professors and learned men. The free and full self-development which to these small states, to ourselves, to our great and growing dominions over the seas, to our kinsmen across the Atlantic, is the well-spring and life-breath of national existence; that free self-development is the one capital offence in the code of those who have made force their supreme divinity and upon its altars are prepared to sacrifice both the gathered fruits and potential germs of the unfettered human spirit. I use this language advisedly. This is not merely a material, it is also a spiritual conflict. Upon this issue everything that contains the promise and hope that leads to emancipation and fuller liberty for the millions who make up the masses of mankind will be found sooner or later to depend.

"Of the actual progress of the war I will say nothing except that in my judgment, in whatever direction we look, there is abundant ground for pride and comfort. I say nothing more, because I think we should bear in mind, all of us, that we are at present watching the fluctuations of fortune only in the early stages of what is going to be a protracted struggle. We must learn to take long views and to cultivate above all other faculties those of patience, endurance, and steadfastness. Meanwhile, let us go, each of us, to do his or her appropriate part in the great common task. Never had a people, as you have most truly said, my Lord Mayor, more or richer sources of encouragement and inspiration. Let us realize, first of all, that we are fighting as a united empire in a cause worthy of the highest traditions of our race. Let us keep in mind the patient and indomitable seamen who never relax for a moment, night or day, their stern vigil on the lonely seas. Let us keep in mind our gallant troops who, today,

after continuous fighting under conditions which would try the mettle of the best army that ever took the field, maintain not only an undefeated, but an unbroken, front.

"And, finally, let us recall the memories of the great men and the great deeds of the past, commemorated, some of them, as you have reminded us, in the monuments which we see around us on these walls, not forgetting the dying message of the younger Pitt, his last public utterance made at the table of your predecessor, my Lord Mayor, in this very hall:—'England has saved herself by her exertions and will, as I trust, save Europe by her example.' England in those days gave a noble answer to his appeal, and did not sheathe the sword until, after nearly 20 years of fighting, the freedom of Europe was secured. Let us go and do likewise."

* * *

Mr. Winston Churchill, first lord of the admiralty, said:

"I have made careful inquiries as to the condition of our sailors in the fleet under the strain put upon them, and this continued watching and constant attention to their duty under war conditions, and I am glad to say that it is reported to me that the health of the fleet has been much better since the declaration of war than it was in time of peace, both as to the percentage of sickness and the character of the sickness, and that there is no reason why we should not keep up the same process of naval control and have the same exercises of sea power, on which we have lived and are living, for what is almost an indefinite period.

"By one of those dispensations of Providence, which appeals so strongly to the German Emperor the nose of the bulldog has been slanted backwards so that he can breathe with comfort without letting go. We have been successful in maintaining naval control thus far in the struggle, and there are also sound reasons for believing that as it progresses the chances in our favor will not diminish but increase. In the next 12 months the number of great ships that will be completed for this country is more than double the number which will be completed for Germany, and the number of cruisers three or four times as great. Therefore I think I am on solid ground when I come here tonight and say that you may count upon the naval supremacy of this country being effectively maintained as against the German power for as long as you wish.

"Some thought there would be a German war, some did not; but no one supposed that a great military nation

would exhibit all the vices of military organization without those redeeming virtues which, God knows, are needed to redeem warlike operations from the taint of shame. We have been confronted with repeated breaches of the law of enlightened warfare, practices analogous to those which in private life are regarded as cheating, and which deprive persons of country adopting them, or condoning them, of the credit and respect due to honorable soldiers.

"We have been confronted with all this. Let us not imitate it. Let us not try to make small retaliations and reprisals here and there. Let us concentrate upon the simple, obvious task of creating a military force so powerful that the war, even in default of any good fortune, can certainly be ended and brought to a satisfactory conclusion. However the war began, now that it is started it is a war of self-preservation for us. Our civilization, our way of doing things, our political and Parliamentary life, with its voting and its thinking, our party system, our party warfare, the free and easy tolerance of British life, our method of doing things and of keeping ourselves alive and self-respecting in the world—all these are brought into contrast, into collision, with the organized force of bureaucratic Prussian militarism.

"That is the struggle which is opened now and which must go forward without pause or abatement until it is settled decisively and finally one way or the other. On that there can be no compromise or truce. It is our life or it is theirs. We are bound, having gone so far, to go forward without flinching to the very end.

"Now the war has come, and when it is over let us be careful not to make the same mistake or the same sort of mistake as Germany made when she had France prostrate at her feet in 1870. Let us, whatever we do, fight for and work towards great and sound principles for the European system. And the first of those principles which we should keep before us is the principle of nationality—that is to say, not the conquest or subjugation of any great community or of any strong race of men, but the setting free of those races which have been subjugated and conquered; and if doubt arises about disputed areas of country we should try to settle their ultimate destination in the reconstruction of Europe which must follow from this war with a fair regard to the wishes and feelings of the people who live in them.

"That is the aim which, if it is achieved, will justify the exertions of the war and will make some amends to the world for the loss and suffering, the agony of suffering, which it has

wrought and entailed, and which will give to those who come after us not only the pride which we hope they will feel in remembering the martial achievements of the present age of Britain, but which will give them also a better and fairer world to live in and a Europe free from the causes of hatred and unrest which have poisoned the comity of nations and ruptured the peace of Christendom.

"I use these words because this is a war in which we are all together—all classes, all races, all states, principalities, dominions and powers throughout the British Empire—we are all together. Years ago the elder Pitt urged upon his countrymen the compulsive invocation, "Be one people." It has taken us till now to obey his appeal, but now we are together, and while we remain one people there are no forces in the world strong enough to beat us down or break us up."

Trials of the Sewall Ships

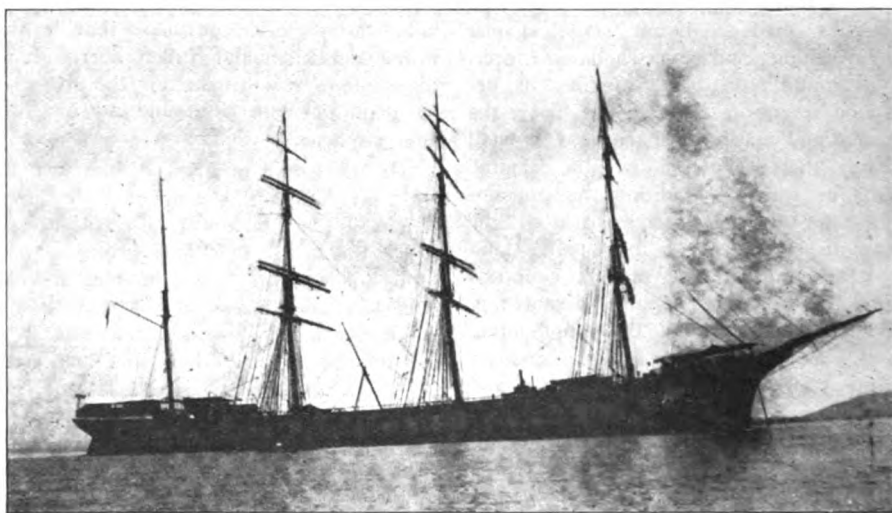
The four-masted steel ship *Edward Sewall*, one of the last survivors of the famous *Sewall* fleet of Bath square-riggers, has just completed at Seattle one of the most remarkable and eventful trips in the history of that old firm. Her experience is typical of the windjammers' up-hill fight of recent years.

The *Sewall*, in command of Capt.

Blanca again three weeks after she set out.

Further repairs, complicated with trouble with an unruly crew, consumed a month more. On Feb. 26 the *Sewall* went to sea again, and so completely dropped from commerce lanes that she was given up as lost with all hands. But on July 3 she came into Honolulu 264 days out from Philadelphia; thousands of miles off her course, almost a wreck aloft, out of provisions and with crew in a state of collapse from a terrific encounter with a typhoon in the South Pacific. Once more her damages were patched up and the harassed square-rigger resumed her voyage. She arrived at Seattle 292 days from Philadelphia.

But four vessels remain of this much decimated fleet, once one of the finest under the American flag. All of them have figured in the news columns of late. The ship *William P. Frye*, a duplicate of the *Sewall*, not long ago arrived at San Francisco from Baltimore after a thrilling experience with a smoldering coal cargo off Cape Horn. The four-masted ship *Dirigo*, which has lately carried two cargoes of grain from Puget Sound to England and thereby carried *Old Glory* into ports where it has been practically unknown for many years, was feared lost when one of her life buoys was picked up at sea, but came to port safely many days later.



FOUR-MASTED STEEL SHIP EDWARD SEWALL, BUILT AT BATH, ME., IN 1899

Quick, sailed from Philadelphia with a cargo of coal for Seattle, on Oct. 19, 1913, and fought head gales clear into the South Atlantic. Off Cape Horn in December she was partly dismasted in a heavy storm, and ran back over 1,000 miles to Bahia Blanca for repairs. Sailing again after completing them on Jan. 6, 1914, she encountered another gale and lost more spars and rigging, which forced her to scud before it and seek Bahia

The *Kineo*, last of the quartet of *Sewall* survivors and only steel five-mast schooner ever built, made a 77-day passage from Port Arthur, Texas, to Providence last spring, which was full of excitement. She arrived at Nassau 42 days out with cargo of lumber shifted and with loss of sails and provisions. On going to sea again after making repairs she sprang a leak, and was reported in distress 160 miles off Diamond Shoal. The revenue

cutter Onondaga went out in search of her, cruised till she ran out of coal and returned to port without finding the cripple. Meanwhile the Kineo sailed into Delaware Breakwater in a badly damaged condition, and finished her voyage in tow.

Some years ago the Kineo, one of the few big schooners to engage in such trade, took a cargo of coal from Norfolk to Manila, and thence a similar one from Sydney, Australia, to Honolulu. On the passage the crew came down with beri-beri, and for days the management of the vessel devolved almost wholly upon her skipper, the late Capt. Frank W. Patten, and his plucky wife, their feat becoming a memorable one in marine annals. On her return trip the Kineo loaded sugar in Hawaii for Philadelphia. When she arrived at the breakwater, 213 days out, she had been given up for lost.

Many of the defunct Sewall ships met tragic ends. The Arthur Sewall, another line steel four-master, was lost at sea with all hands seven years ago on a voyage from Philadelphia to Seattle. The Susquehanna, Rapahannock and Roanoke, wooden four-mast ships, were burned, and the Iroquois, a wooden ship, was lost in a typhoon in the China Sea in 1901.

Several are still afloat under other ownership. The Benjamin F. Packard is in the Alaska salmon trade out of San Francisco. The Shenandoah and W. F. Babcock were sold and converted into barges for the Atlantic coast coal trade, and the Erskine M. Phelps, a steel four-mast ship and credited with some of the fastest deep water passages ever made by American windjammers, is engaged in the somewhat anomalous business of being towed from port to port on the Pacific in the oil trade, with her yards still aloft.

Detained in American Ports

A report issued recently by the Bureau of Navigation shows that there are fifty-nine German steamships and twelve Austrian vessels held up in ports of this country. Of the Hamburg-American Line twenty-four vessels are lying idle in this port, in Boston, Baltimore, Philadelphia, New Orleans and Norfolk, Va. The total tonnage represented by the twenty-four steamships is 243,459 gross.

The North German Lloyd has twelve vessels at various American ports, the total tonnage being 147,787. Of the Deutsch-Amerika Petroleum Co., really owned by the Standard Oil Co. of New York, there are fourteen tank steamships aggregating 73,232 tons, while the Hansa Line, with two steamships tied up, and other smaller companies with

one steamship each out of commission, add 30,032 tons to the list of idle tonnage. In all, the war has resulted in the internment here of steamships aggregating a tonnage of 494,510.

The twelve Austrian steamships involve a gross tonnage of 57,373, and the list comprises twelve steamships of the Unione Austriaca Co., three vessels of the D. Tripovich Steamship Co. and two of the Atlantica Sea Navigation Co.

The idle fleet is as follows:

AT NEW YORK.

Geo. Washington (Ger.)	Pennsylvania (Ger.)
Pisa (Ger.)	Adamsturm (Ger.)
Pres. Lincoln (Ger.)	Allemania (Ger.)
Vaterland (Ger.)	Armenia (Ger.)
M. Washington (Aust.)	Clara Menning (Ger.)
Barbarossa (Ger.)	Hagen (Ger.)
Fried. der Grosse (Ger.)	Harburg (Ger.)
Pres. Grant (Ger.)	Hartland (Br.)
Prinzess Irene (Ger.)	Kiowa (Ger.)
Himalaja (Aust.)	Magdeburg (Ger.)
Ida (Aust.)	Meppen (Ger.)
Kr. Wilhelm II (Ger.)	Nassovia (Ger.)
Bohemia (Ger.)	Portonia (Ger.)
König Wilhelm II (Ger.)	Pr. Eit. Friedrich (Ger.)
Maia (Ger.)	Prinz Joachim (Ger.)
Dora (Aust.)	Prometheus (Ger.)
Grosser K'fuerst (Ger.)	Sarnia (Ger.)

AT BAR HARBOR, ME.

Kronprinzessin Cecilie (Ger.)

AT BOSTON.

Amerika (Ger.)	Erny (Aust.)
Willehad (Ger.)	Kolu (Ger.)
Wittkind (Ger.)	Ockenfels (Ger.)
Cincinnati (Ger.)	

AT PHILADELPHIA.

Rhaetia (Ger.)	Ems (Ger.)
Prinz Oskar (Ger.)	Pennoil (Ger.)
Franconia (Aust.)	

AT BALTIMORE.

Bulgaria (Ger.)	Neckar (Ger.)
Rhein (Ger.)	

AT NEWPORT NEWS, VA.

Arcadia (Ger.)

AT NEW ORLEANS, LA.

Breslau (Ger.)	Georgia (Ger.)
Clara (Aust.)	Andromeda (Ger.)
Teresa (Aust.)	

AT PORT ARTHUR, TEX.

Dacia (Ger.)

AT GALVESTON.

Campania (Aust.)	Morawitz (Aust.)
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Shelter Decks

The following instructions have been sent to the collectors of customs by the Commissioner of Navigation:

Pending a revision of regulations concerning measurement of vessels (portions of Articles 82, 86, 87, Customs Regulations, 1908), you may receive and forward with your report under Article 84 an application by the owner of any sea-going steam vessel of the United States for a review of measurement on the ground that additions in the outstanding registers have been made to the gross tonnage for sheltered spaces above the upper deck (Act of March 2, 1895, Sec. 1 (h)), which is under cover and open to the weather; that it is not enclosed.

2. Owners should be advised that where a vessel is treated as a shelter deck vessel, the freeboard, ascertained under foreign load line laws and regulations and by the classification so-

cieties, will doubtless be measured downward from the line of the deck below the shelter deck.

3. Detailed instructions will follow, but, in general, poops, bridges, or any other permanent erections with one or more openings in the sides or ends not fitted with doors or other permanently attached means of closing them, should not be measured and included in the tonnage.

Obituary

Thomas Congdon, former principal surveyor of Lloyd's Register of Shipping in the United States, died at Glen Ridge, N. J., on Sept. 21, at the age of 85 years. Mr. Congdon was one of the oldest surviving veterans of Lloyd's Register's staff. He began his career at the age of 14 as an apprentice shipwright at the Royal Dockyard, Devonport, at a time when all warships of the British navy were built of wood and steam only spoken of as a possibility. He joined the staff of Lloyd's Register in 1856, serving at Greenock, Bristol and London. In 1882 he went to New York as principal surveyor in the United States and served in that capacity until 1901 when he retired on a pension. Since his retirement Mr. Congdon has continued to make his home in this country. His friends included practically every one who has been associated with the shipping business at New York for the past 30 years and his death is universally regretted. He is survived by two sons, Ernest W. Congdon, associated with the firm of Wilcox, Peck & Hughes.

Lieut. Col. A. E. Congdon, an officer on the active list of the British army, and Ernest W. Congdon, associated with the well known insurance firm of Wilcox, Peck & Hughes, New York.

A bill has been introduced in the house by Congressman Adamson authorizing the secretary of the treasury to construct one steam revenue cutter for service in the waters of California at a cost not to exceed \$350,000, and one steam revenue cutter for service as anchorage patrol boat in New York harbor, at a cost not to exceed \$110,000, such vessel to be especially constructed for ice breaking.

Several new steel barges, to operate between Savannah and Augusta, have been completed for the Augusta-Savannah Navigation Co. These barges, propelled by gas producer engines, are the first of their kind to be used in Southern waters and have a carrying capacity of 300 bales of cotton each on a draft of four feet. They will also have passenger accommodations.

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November, 1914

Our Need of Ships

No nation could feel more keenly the need of ships than the United States does at the present time. We are at an enormous handicap in reaching the South American market on account of the want of ships. A golden opportunity awaits that country which can promptly seize this market. South America cannot be expected to be much of a buyer from the outside world until she is enabled to sell some of her own products. Her sales to Europe at the present time must be practically nil owing to the inability of any ships to reach the countries now at war. It would be fine business judgment for the United States to purchase liberally from South American markets whatever they have to sell that it can use. By that means we would build up a lasting trade because trade after all is not so much a matter of money as it is of barter. The rub here lies in the fact that we have not the ships to carry the commodities to and from South America. If we had them, we would certainly now be doing a splendid business with this great market which is practically excluded from the rest of the buying world.

How many, many times has it been pointed out in these columns that exactly this very situation might some day be encountered. The bill which was introduced in congress ten years ago as a result of the tour of the Merchant Marine Commission throughout the country was a very wise measure. It was a far-sighted measure and it would have forestalled the very mischief of which we are now complaining. Some day our congress may see the light. They have dwelt in darkness for a long time but some day, and perhaps soon, the light may break in upon them. Meanwhile

all sorts of subterfuges are resorted to except the palpable one to remedy the evil. Government-owned ships won't get us anywhere. They would simply drive out of existence the small fleet that is now operating under the American flag. No private enterprise could be expected to compete with a government-owned line. Nor will the admission of foreign-built ships to American register alter the situation materially. The only vessels that are adopting American register are those that are already owned by American corporations and they carry nothing except the product of those corporations. They do not help in the extension of the American export trade in general. What we want is a great fleet of private-owned steamships carrying through the American flag and running to those ports which are not now reached by American steamers. We could be doing a big business with Germany today if we had the ships to do it with. No British ship will carry a single pound of our products to Germany but there is no reason why we might not be doing a thriving business in non-contraband articles with that country had we the ships to carry them.

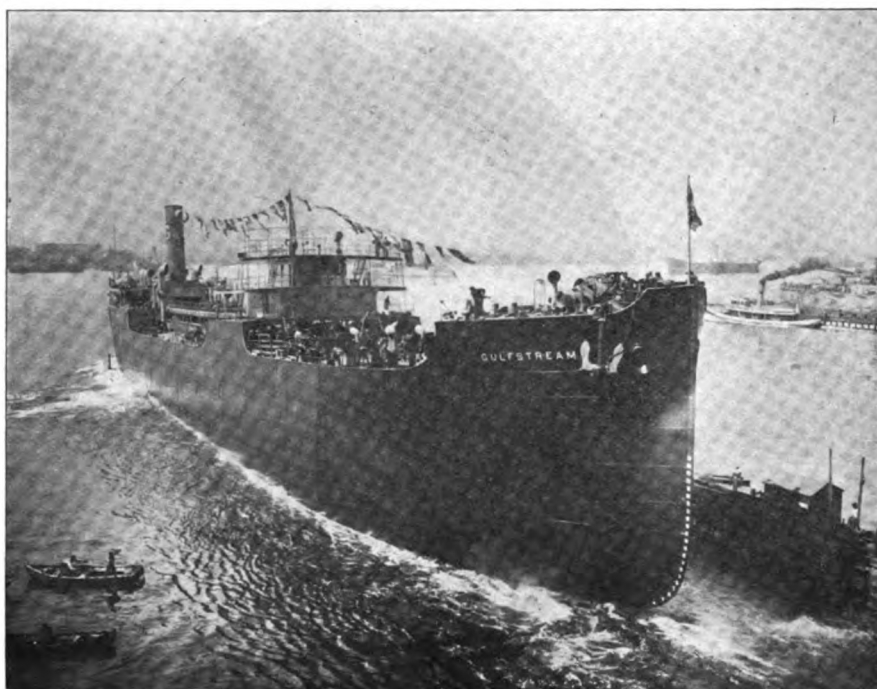
Lake Trade

No season in lake trade has ended as dismally as the present one. Ordinarily there are very fine finishes in the trade owing to the desire of shippers to have their commodities moved before navigation becomes impossible. Nothing of the sort, however, characterizes the present season. Shippers some time ago began to send their own vessels to dock owing to their inability to provide them with cargoes. Other vessels are accepting part loads, while the grain rate for prompt loading seems to have got a strangle hold at 1 cent. Carrying a bushel of grain a thousand miles for 1 cent, and paying half a cent of that to get the grain out of the vessel, in addition to suffering a delay of from four to five days at the unloading port, is mighty discouraging business. Notwithstanding all this, lake vessel owners are paying the highest wages ever known in the business and are providing the men aboard ship with creature comforts that are far and away beyond anything known elsewhere. Moreover, through the Lake Carriers' Association they have spent much time and attention in seeing to it that all foodstuffs are pure and clean and that all drinking water is beyond the possibility of contamination. They have certainly played their part well.

The United States district court of New York has just handed down a decision to the effect that North Atlantic passenger conference agreements do not constitute unreasonable restraint of trade and are, therefore, legal under the Sherman law. The court has apparently based its conclusions upon the language of the report of the Alexander committee to the House of Representatives on the subject in which the committee stated that if there were no conference the lines would engage in rate wars or consolidate. An appeal will now be taken to the United States Supreme Court.

Oil Tanker Gulfstream

The Gulf Refining Co., New York, has just added a new oil tank steamer, the Gulfstream to its fleet for their coast-wise trade between Texas and Atlantic ports. The new steamer is a duplicate of the Gulfoil and was built by the New York Ship Building Co., Camden, N. J., to the highest class of Lloyds register. She is built on the Isherwood longitudinal system of construction and is 406 feet 6 inches over all, 51 feet beam and 30 feet 2 inches deep. Her capacity is 2,285,000 gallons of oil in bulk, contained in twenty-two separate oil-tight compartments, in addition to which there is also a large cargo hold, and smaller compartments, fitted with all the necessary cargo booms, winches and handling gear in which barreled oil or general cargo can be transported.



LAUNCH OF OIL TANKER GULFSTREAM

She has two decks with raised poop and quarter deck, while the expansion trunk is carried above the upper deck.

The propelling machinery of the Gulfstream is located aft and consists of triple-expansion engines having cylinders 27, 45 and 75 inches by 48 inches stroke, developing 2,700 maximum indicated horsepower. She is designed for an average service speed of 11½ knots. Steam is supplied by three single-ended Scotch boilers, 14 feet 8 inches diameter and 11 feet long, at a pressure of 190 pounds. She can burn either coal or oil, her oil burners being of the mechanical atomizing type. The bunkers for the fuel oil have a capacity of 176,000 gallons and are placed at both ends of the vessel, so that cargo or fuel may be carried.

The vessel is fitted with the usual

auxiliaries, in addition to which there is installed a 2-ton ice machine connected with ample cold storage capacity, providing an abundant supply of fresh stores at all times. The engine room is also fitted with an up-to-date machine shop with a complete outfit of tools necessary for making ordinary repairs. There are seven cargo pumps, each capable of discharging cargo at the same time through independent lines. The steering engine is fitted directly on the rudder stock and operated from the bridge and from aft by telemotor gear. There is also an independent hand gear which can be used in times of emergency. A powerful automatic towing machine has been placed on the stern of the ship. The officers' and wireless operator's quarters are located in a house amidships, raised above the deck. The

dining saloon is located in the after section and is connected with the house amidships by a fore and aft bridge. The engineers, petty officers, seamen and wipers are berthed under the raised quarter deck in the after section, which also accommodates the saloon, mess rooms, galley, stewards' storerooms, etc. The electric generating plant consists of two 10-kilowatt General Electric marine direct connected sets for 110 volts, driven by vertical engines located on the main deck in the engine space.

The plan to widen the Menominee river above the West Water street bridge at Milwaukee will now be pushed to completion as the Chicago, Milwaukee & St. Paul railroad has dedicated the necessary land for that purpose.

Miscellany

Under the terms of the Panama Canal Act, the railroads were forbidden to own or operate any water line after July 1, 1914. There were so many individual problems involved in this enactment, however, that the Interstate Commerce Commission found it impossible to give a ruling on the numerous applications and therefore issued a general order permitting the railroads to continue their present ownership and operation until ordered otherwise. The commission began the consideration of lines affected on the great lakes during the early part of October and expect to reach a decision some time before the close of the year.

J. G. White of New York, has established three scholarships in the Spanish language at the Pennsylvania State College, in line with the general movement throughout the country to seize opportunities offered for the expansion of United States trade in South America through the opening of the Panama canal and the war in Europe. He offered the prizes "as a stimulus to the students to fit themselves for handling Latin-American trade." Mr. White's offer was accepted by the board of trustees.

The new tug J. Hooper Hammersley, building for the Seamen's Church Institute, New York, at the yard of Wm. R. Osborn, Croton-on-the-Hudson, N. Y., will be launched shortly. The new tug is 77 feet x 16 feet x 8 feet., and will accommodate 100 seamen with their dunnage at one time. She will be fitted with a fore and aft compound 75 horsepower engine, built by Skinner & Arnold, Albany, N. Y., and a water-tube boiler. The Hammersley was designed by Clinton H. Crane of New York.

The Great Northern Pacific Steamship Co., with a capitalization of \$5,000,000, has been incorporated at Salem, Ore. This company will operate steamers on the Columbia river and Pacific ocean, according to its articles of incorporation. Two big passenger steamers now building to ply between Astoria and San Francisco are nearing completion. The new steamship company is a subsidiary of the Hill railroad lines.

The British steamer LaHesbaye was recently converted from a coal to an oil burning vessel by having installed the latest White mechanical fuel oil burning system for natural draft by the Washington Engine Works, New York. The vessel has been renamed Panuco and was changed to American register.

The steamer Alpena of the Wyandotte Transportation Co.'s fleet was loaded with 5,200 tons of stone at Alpena in 40 minutes on Sept. 21.

Changes in American Ship

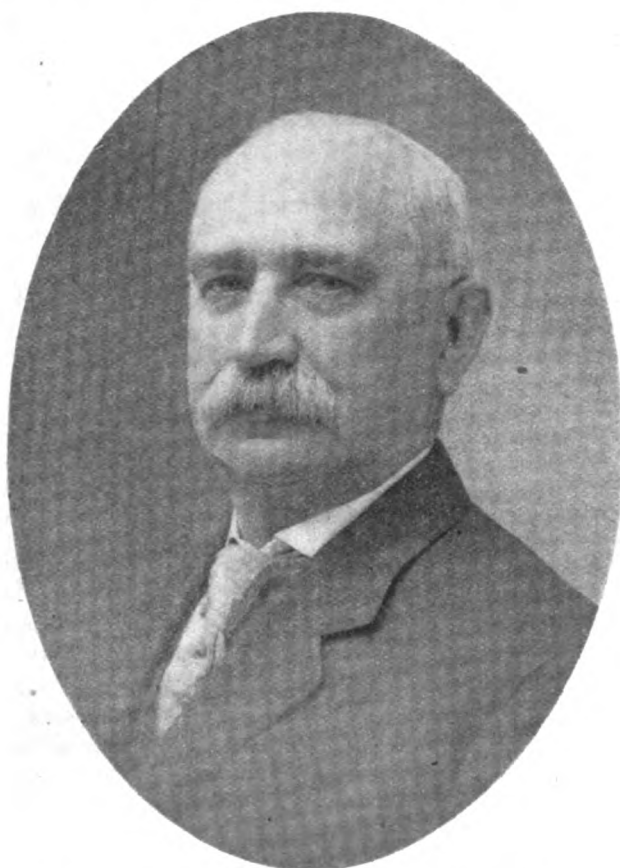
*J. C. Wallace Resigns as President and Edward Smith
is Elected to Succeed Him—M. E. Farr is Vice President*

JAMES C. WALLACE resigned as president of the American Ship Building Co., during the latter part of September and Edward Smith of Buffalo was elected to succeed him. Mr. Wallace had been identified with the American Ship Building Co. since its formation, having been made general manager when the various yards were combined in 1899. He subsequently succeeded W. L. Brown as president of the company and under

light but the general opinion of him is that he is one of the big men in lake trade. His career has been long and arduous and he has been in many a fight, but it has been said of him that whatever he went into he always came out perfectly clean. His first important connection was with the firm of Brown & Co., Buffalo, of which he quickly became the silent but controlling factor. He was a leading figure in systematizing the insurance business of the great

lakes, though he has announced his intention of resigning from the towing company in order to devote his entire attention to the ship building business.

M. E. Farr, who has been elected vice president of the American Ship Building Co., is one of Detroit's best known men. He was born in Clayton, Jefferson county, N. Y., on October 5, 1863, and after graduating from the Clayton high school followed the lakes



EDWARD SMITH
PRESIDENT AMERICAN SHIP BUILDING CO.



M. E. FARR
VICE PRESIDENT AMERICAN SHIP BUILDING CO.

his administration the lake fleet was greatly increased and the type of bulk freighter practically revolutionized. He undoubtedly wrote more orders for steel freighters than any man who has ever been associated in the ship building business.

Edward Smith, his successor, has been identified with lake trade since the days of sailing vessels and he will undoubtedly prove a very valuable asset for the ship building company as he possesses unusual qualities as an executive officer. Mr. Smith's methods are very quiet. He is rarely in the lime-

lakes, which eventually led to the founding of the Great Lakes Register. When H. Coulby relinquished the presidency of the Great Lakes Towing Co., after bringing order out of chaos, to accept the presidency of the Pittsburgh Steamship Co., Mr. Smith was regarded as the one man capable of succeeding him. Mr. Smith's business methods are thoroughly sound and no doubt whatever is expressed that the American Ship Building Co. will thrive under his management. He has for many years been the president of the Buffalo Dry Dock Co., which position he will con-

for one season. In the following year he entered the employ of the banking firm of Elias Farr & Co., located at Marquette, Nebraska. At the age of 21 he was made cashier of the bank, which was later incorporated under the title of The Bank of Marquette and still later as the First National Bank. At the age of twenty-two Mr. Farr had full charge of the bank's affairs. In 1892 he went to Detroit and entered the employ of the Detroit Dry Dock Co. as book-keeper and cashier. In May 1899 he was made secretary and treasurer and in 1905 succeeded W.

C. McMillan as vice president. In 1907 he was elected president, succeeding W. C. McMillan. In addition to being a director, member of the executive committee and vice president of the American Ship Building Co., Mr. Farr will retain the office of president and treasurer of the Detroit Ship Building Co. He is also president and treasurer of the Calcite Transportation Co., a director in the Scotten-Dillon Co., and a director in the First & Old Detroit Savings Bank. He is also interested in a number of business enterprises in Detroit and is generally identified with the educational, charitable and philanthropic affairs of the town. He is a connoisseur in paintings and has been a consistent collector of valuable works of art for several years past. He is a member of the Detroit Club, the Bloomfield Hills Country Club, Detroit Athletic Club, Bankers' Club, Detroit Boat Club and the Old Club. He is also a member of the Society of Colonial Wars, having served in the American Revolution.

Savings Plan

During the present year men aboard the vessels enrolled in the Lake Carriers' Association have been enabled to save a great deal of money, more so pro rata than in any other year. Actual statistics as to the exact amount saved are not obtainable because some of the accounts are carried in the home banks; but the Cleveland Trust Co. has made an especial effort to care for the savings of sailors and has evolved a plan whereby they can conveniently deposit and withdraw their money without leaving the ship at all.

There is a wide difference, however, in the amounts that are being saved on individual vessels, which can be explained only by the fact that the licensed officers of some vessels take a greater interest in furthering the savings than do others. It is known that some masters make a practice of urging the men to save when they are paid off at the conclusion of each trip. If a sailor has no dependents, there is no real reason why he might not save nearly all that he earns, as practically all of his living expenses are borne by the ship. Some really do save nearly all, as for instance, a fireman to whom \$10.75 was due on one boat instructed the captain to deposit \$10 of it and took only 75 cents in cash. Some of these accounts run up into the hundreds of dollars and in one instance, that of a licensed officer has reached the very respectable sum of \$2,000.

On Oct. 1 the wage scale on all vessels enrolled in the association was advanced for the unlicensed men. For instance, boatswains who up to Oct. 1

were receiving \$60 will receive \$70 from Oct. 1 on. Porters who have been receiving \$30 will receive \$35. Oilers who have been receiving \$55 and firemen and watertenders who have been receiving \$52.50, will be advanced to \$65. Wheelmen, lookouts, who have been receiving \$55 will receive \$65. Wheelmen who have been receiving \$50 will receive \$65. Lookouts will be advanced from \$50 to \$65 and ordinary seamen from \$31.50 to \$40.

It would be a very good idea for every master on the Lake Carriers vessels in paying off under this advanced scale to urge the men to save the whole of the advance. This is certainly a sum that the men can spare out of their wages without any trouble whatever in addition to what they have been saving regularly and the combined sum ought to make a nice little nest egg for the winter months.

Special Fog Signal Service at Fort Gratiot

Quite a ripple was caused in vessel circles by the discontinuance of the special fog signal indicating the presence of fog in St. Clair river when it was clear outside. For the past three years the Fort Gratiot light steamer has performed this service for the river is frequently thick with fog when it is perfectly clear in Lake Huron. One of the results of this atmospheric condition was the sinking of the steamer Joliet on Sept. 22, 1911, in collision with the steamer Henry Phipps, and at that time President William Livingstone of the Lake Carriers' Association worked out a solution of the difficulty. Telephone service was installed in the Fort Gratiot light station at the expense of the Lake Carriers' Association and the lighthouse keeper was informed by the river agents of the association whenever fog was prevalent in the river. The lighthouse keeper accordingly blew a special signal to vessels to indicate that fact. Early in September, however, Lighthouse Inspector Woodruff on a tour of the district ordered this telephone taken out and the special signal service discontinued on the ground that it was never authorized. President Livingston of the Lake Carriers' Association was under the impression that the service had received the authority of the Lighthouse Department and so represented the situation to Mr. Woodruff. It was the understanding with Mr. Woodruff that the telephone would be restored at once and the special service resumed, but a few days later came a definite announcement from the lighthouse establishment in Washington that the service would be permanently discontinued. This announcement was so surprising to

the vessel interests that President Livingstone immediately took up the subject with Washington direct with the result that the department ordered the service resumed on Sept. 25. It really should not have been suspended at any time as it is a most important aid to navigation. As a matter of fact, over 30 vessels were at anchor at the foot of Lake Huron on Oct. 6 owing to the presence of dense fog in the St. Clair river immediately below Port Huron. It was perfectly clear in the open lake at the time and undoubtedly many of the vessels would have been caught in this trap had they not been notified to keep out of it. The order to discontinue the service was certainly a most mystifying thing.

Wreck of W. C. Richardson Removed

The wreck of the steamer W. C. Richardson which foundered outside of Buffalo harbor in December, 1909, has been at last entirely removed. Every wrecking company that attempted to remove the hull lost money. The Great Lakes Towing Co. made the first attempt but abandoned it when it became apparent that the wreck could not be raised without heavy loss to the company. The Reid Wrecking Co. of Port Huron and Capt. H. W. Baker of Detroit then undertook to work jointly on the "No Cure No Pay" plan but were forced to abandon the attempt even after they had tried to cofferdam the wreck. The Hinckley Wrecking Co. of Cape Vincent then undertook the contract but were also forced to quit. Johnson & Virdin, Lewes, Del., then took the contract and finished the job, though at a financial loss. This company dynamited the hull, then lifted the steel bit by bit and sold it for scrap.

The steamer William Henry Mack, formerly owned by the Jenkins Steamship Co., Cleveland, O., and now owned by Lake Commerce, Ltd., Toronto, Ont., was recently renamed Valcartier and transferred to Canadian register. The Valcartier is a steel vessel, built at Cleveland in 1903, and is 345 feet long, 48 feet broad and 28 feet deep, with a gross tonnage of 3,781 and a registered tonnage of 2,923. She is equipped with triple expansion engines with cylinders 20, 33½ and 55 inches in diameter by 40-inch stroke, supplied with steam from two Scotch boilers, 12 feet 10½ inches diameter by 13 feet long, with four furnaces, having 108 square feet grate area, 4,229 square feet heating surface and a working pressure of 175 pounds.

Tribute to Charles W. Wall

No marine engineer is better known along the chain of lakes than Charles W. Wall who, with slight interruption, has been continuously in the employ of the Erie railroad lake line since 1867. Mr. Wall was born in New York City on May 1, 1844, but was taken to Buffalo by his parents at the age of one year. After a desultory course in the public schools of Buffalo he entered the employ of the old Shepard Iron Works, now the King Iron Works of H. G. Trout Co., as apprentice machinist, where he remained until the civil war broke out. On Aug. 9, 1862, he enlisted



MR. CHARLES W. WALL

as a private in Company C, 116th regiment, New York Volunteer Infantry, and served with it through all of its battles with the exception of the Red River campaign, during which period he was on the sick list. He was one of the volunteers in the memorable assault on Fort Hudson, La., May 27, 1863, known in history as the "Forlorn Hope." He was also with Sheridan at Winchester and Cedar Creek, Va., in October, 1864. He was mustered out of the service at Fort Porter, Buffalo, June 26, 1865, at the age of 21 years with the rank of corporal. He entered the service of the Erie railroad as assistant engineer of the steamer Arctic in 1867 and with the exception of the few years during which he was in the employ of the United States government as chief engineer of the lighthouse tender Haze, he has been continuously in the employ of the Erie as machinist, shop foreman, chief engineer of its lake steamers, fleet engineer, superintendent of the Erie elevator, and since its destruction by fire in May, 1913, assistant to the superintending engineer of the Erie railroad lake line.

A few of Mr. Wall's old associates in the Erie system recently presented him with a beautiful silk flag, an exact half-size replica of the house flag flown by the ships of the Erie fleet. The flag is complete in the least detail, with jack-staff, halyards, cleats, etc., and bears autographs on white silk applique of the officers of the Erie under whom he has served. No more appropriate gift could possibly be bestowed upon an old comrade.

Ore Shipments

Ore shipments during September were 5,431,307 gross tons as against 7,259,662 gross tons for September, 1913, a decrease of 1,328,355 gross tons. The movement to October 1, 1914 was 26,109,413 gross tons as against 39,273,417 gross tons to October 1, 1913, a decrease of 12,564,404 gross tons. As vessels are being constantly sent to dock, owing to scarcity of cargoes, the October movement will show a considerable falling off from that of September and the indications are that very little ore will be moved in November. In fact, a number of the shippers except to be through before the end of October and the total season's movement will not be much in excess of 32,000,000 tons. Following is the movement by ports during September and up to Oct. 1, with corresponding data for the preceding year:

Port.	Sept., 1913.	Sept., 1914.
Escanaba	673,591	553,959
Marquette	418,242	335,928
Ashland	485,174	662,141
Superior	2,225,802	1,901,422
Duluth	1,938,823	1,126,532
Two Harbors	1,518,030	851,325
1914 decrease	7,259,662	5,431,307
		1,328,353

Port.	To Oct. 1, 1913.	To Oct. 1, 1914.
Escanaba	4,297,223	3,019,651
Marquette	2,573,604	1,385,718
Ashland	3,558,802	2,741,917
Superior	10,818,324	9,478,253
Duluth	9,830,726	5,278,899
Two Harbors	8,194,738	4,804,975
1914 decrease	39,273,417	26,709,413
		12,564,404

Lake Erie Ore Receipts

Out of a total shipment of 5,431,307 gross tons of ore during September, 4,260,529 tons were received at Lake Erie ports, distributed as follows:

Port.	September, 1914.
Buffalo	518,072
Erie	72,710
Conneaut	1,117,604
Ashtabula	806,459
Fairport	267,680
Cleveland	938,538
Lorain	299,296
Huron	97,078
Toledo	97,357
Detroit	45,735
Total	4,260,529

Captain Samuel Burnham of Port Huron, until recently master of the Pere Marquette car ferry at Detroit, died at his home on Oct. 1.

Commerce of Lake Superior

The commerce of Lake Superior during September totalled 8,417,716 net tons, a decrease of 417,270 tons from the August movement, which was the record movement for the present year. The movement to Oct. 1 totals 43,003,675 tons as against 60,073,294 tons to Oct. 1, 1913, a decrease of 17,039,619 tons. Following is the comparative statement:

EAST BOUND.		
	To Oct. 1, 1913.	To Oct. 1, 1914.
Copper, net tons.....	72,466	47,237
Grain, other than wheat, bushels	63,847,767	37,945,528
Building stone, net tons	6,181	.....
Flour, barrels	6,722,826	6,725,452
Iron ore, net tons.....	37,986,011	25,923,002
Pig iron, net tons.....	44,829	13,713
Lumber, M. ft. B. M.	442,829	348,248
Wheat, bushels	92,811,578	81,645,763
Unclass. frght., net tons ..	313,774	201,114
Passengers, number ...	35,860	27,546

WEST BOUND.		
	To Oct. 1, 1913.	To Oct. 1, 1914.
Coal, anthracite, net tons ..	2,110,934	1,589,501
Coal, bituminous, net tons ..	12,610,557	9,714,223
Flour, barrels	1,263	662
Grain, bushels	400	.....
Mctd. iron, net tons.....	262,812	177,613
Iron ore, net tons.....	32,376	.....
Salt, barrels	504,659	565,736
Unclass. frght., net tons ..	875,335	799,303
Passengers, number ...	38,395	30,019

SUMMARY OF TOTAL MOVEMENT		
	To Oct. 1, 1913.	To Oct. 1, 1914.
East bound, net tons.....	44,005,765	30,668,547
West bound, net tons.....	16,067,529	12,365,128
Total	60,073,294	43,033,675
Vessel passages	17,472	14,556
Net registered tonnage.....	43,198,450	33,001,748

September Lake Levels

The United States lake survey reports the stages of the Great Lakes for the month of September, 1914, as follows:

Lakes.	Feet above mean sea level.
Superior	602.80
Michigan-Huron	580.48
Erie	572.37
Ontario	246.09

Lake Superior is 0.04 foot higher than last month, 0.03 foot lower than a year ago, 0.07 foot above the average stage of September of the last 10 years, 1.28 feet below the high stage of September, 1869, and 1.31 feet above the low stage of September, 1879. Average stages of the last 10 years indicate that the October level will remain about stationary.

Lakes Michigan-Huron are 0.16 foot lower than last month, 0.45 foot lower than a year ago, 0.41 foot below the average stage of September of the last ten years, 2.95 feet below the high stage of September, 1876, and 0.82 foot above the low stage of September, 1911. Average stages of the last 10 years indicate that the October level will be 0.2 foot lower.

Lake Erie is 0.22 foot lower than last month, 0.38 foot lower than a year ago, 0.07 foot below the average stage of September of the last 10 years, 1.57 feet below the high stage

of September, 1876, and 1.09 feet above the low stage of September, 1895. Average stages of the last 10 years indicate that the October level will be 0.3 foot lower.

Lake Ontario is 0.24 foot lower than last month, 0.65 foot lower than a year ago, 0.25 foot below the average stage of September of the last 10 years, 1.52 feet below the high stage of September, 1862, and 2.09 feet above the low stage of September, 1895. Average stages of the last 10 years indicate that the October level will be 0.3 foot lower.

Burning of the Sheboygan

It is probably true that no inanimate thing arouses sentiment as much as does a vessel, and the reason probably is that having motion it simulates life. Moreover, its whole existence is spent in braving the elements. The passing of such a creature after 45 years of service

ed record for a firm in the dry dock business on the Great Lakes. During this time, three dry docks have been built, two of which are still in use, and the building and operating of them have been financed entirely by the Muir family without any help from government or other sources. The present two dry docks which took the place of a floating one were built in 1863, and the original gates then hung did service for 50 years, a new pair having been installed only this spring and other necessary repairs made.

Coal Docks on Lake Erie

Appended herewith is a table of coal docks at lower lake ports, giving the name of the port, the name of the railroad owning the dock, the type of machine used in loading coal aboard vessels, together with the capacity of the machine per hour. The information

both paddle boxes. The Forest City is engaged in a local passenger traffic in the neighborhood of Port Arthur and Fort William.

A new car ferry which may also act as an ice breaker was recently placed in commission at Quebec to run to Levis. This new ferry embodies two unique features, the first being her deck, which may be raised or lowered to meet the requirements of her route, which comprises a difference in tides of 18 feet, and the second being her nickel steel screw propeller, which in the winter season is designed to clear the ice from the landing stage.

The Kiel canal, which is of enormous strategic importance to Germany, connects the river Elbe in the North Sea with the fjord of Kiel in the Baltic Sea, and traverses a distance of about 60 miles. Its normal



THE LAST OF THE SHEBOYGAN

cannot be regarded with other than a note of sadness. It was doubtless with a feeling akin to grief that the officials of the Goodrich Line witnessed the burning of the steamer Sheboygan during the latter part of September. The Sheboygan was the first boat built for that company but like many another craft had outlived her usefulness. She was towed a mile north of the harbor piers at Manitowoc and burned with proper ceremony. As the old craft was pulled out into open water by the tug Arctic, which had handled her in and out of the harbor for many years, every whistle in the city blew a farewell. This was a far better ending than to be thrown up on the beach for her old frames to bleach.

Muir Bros. Dry Dock

At Port Dalhousie, Ont., at the mouth of the Welland canal, Muir Bros. are enjoying the distinction of having been 64 years operating and owning the dry docks there, which is believed to be the longest uninterrupted

contained in the table was obtained direct from the operators and is accurate and up to date.

width is 335 feet at the surface, with a bottom width of 144 feet and a depth of 36 feet. The new locks have

Port.	Railroad.	Machine.	Capacity per hr.
Erie	Pennsylvania Co.	Wellman-Seaver-Morgan ..	25 cars
Erie	Pennsylvania Railroad	McMyler	30 cars
Conneaut	B. & L. E.	McMyler	14 cars
Ashtabula Harbor ..	Pennsylvania Co.	McMyler	32 cars
Ashtabula Harbor ..	Pennsylvania Co.	McMyler	30 cars
Ashtabula Harbor ..	L. S. & M. S.	McMyler	20 cars
Ashtabula Harbor ..	L. S. & M. S.	McMyler	20 cars
Fairport	B. & O.	McMyler	25 cars
Cleveland	Pennsylvania Co.	Wellman-Seaver-Morgan ..	30 cars
Cleveland	Pennsylvania Co.	McMyler	20 cars
Cleveland	Pennsylvania Railroad	McMyler	20 cars
Cleveland	Erie Railroad	Wellman-Seaver-Morgan ..	20 cars
Cleveland	W. & L. E.	McMyler	20 cars
Lorain	B. & O.	McMyler	10 cars
Lorain	B. & O.	McMyler	20 cars
Huron	W. & L. E.	McMyler	20 cars
Huron	W. & L. E.	McMyler	20 cars
Sandusky	C. C. C. & St. L.	Excelsior	1 car
Sandusky	B. & O.	McMyler	3 cars
Sandusky	Pennsylvania Co.	McMyler	24 cars
Sandusky	Pennsylvania Co.	Wellman-Seaver-Morgan ..	30 to 40 cars
Toledo	Hocking Valley R. R.	Two Brown Hoist	40 cars each
Toledo	Toledo & Ohio Central R. R.	McMyler	20 cars
Toledo	C. H. & D. Ry.	McMyler	30 cars
Toledo	W. & L. E.	McMyler	6 cars

The passenger steamer Forest City has been laid up at Port Arthur and will be repaired during the winter for damage sustained by striking the bank in Mission river and subsequently striking a sunken pile, demolishing

a length of 1,080 feet and a width of 147 feet, but it is possible to divide them by intermediate gates. The canal is of far greater importance as a means of defense than as a commercial artery.

Föttinger Transformer

An Exhaustive Description of This Hydraulic Installation on Board the Ill-Fated Steamer Königin Luise

THROUGH the courtesy of the Engineer of London and the *Zeitschrift des Vereines Deutscher Ingenieure* we are enabled to give the following abstract of an exhaustive article on the Föttinger hydraulic transformer on the steamer *Königin Luise*. The article gains additional interest from the fact that the vessel dealt with was one of the first victims of the war at sea. She was sunk by the ill-fated *Amphion* and some destroyers on August 5.

Over eight years ago the Hamburg-Amerika Co. put into commission a direct turbine-driven steamer the *S. S. Kaiser*, which has fully met all expectations and has held its own with similar ships fitted with reciprocating engines. When recently, however, it was decided to build a sister vessel it was arranged to put in high-speed turbines and reduce the speed of the propeller shafts by means of a Föttinger transformer.

As a comparison, it may be stated that the propeller speed of the *Kaiser* is 560 revolutions per minute and that of the *Königin Luise* 450 revolutions per minute. The dimensions of the latter vessel are, or were: Overall length, 88.42 meters; greatest width, 11.78 meters; and displacement, 1720 tons.

In determining the turbine speed, although the results of a long test with a 10,000 horsepower, installation proved that a reduction ratio of 5.3/1 was quite satisfactory, and that the ratio of 6.5/1 would be quite safe, it was decided to be well on the safe side in this first installation and to adopt a turbine speed of 1800 revolutions per minute and a ratio of 4/1, giving a propeller speed of 450 revolutions per minute, as mentioned above. In view of the fact that the directional rotation of the turbine had not to be reversed since the reversal was affected by means of the Föttinger transformer, and thus the turbines were working under similar conditions to those obtaining with land turbines, it was decided to superheat the steam and thereby considerably increase the fuel economy. This decision carried with it the adoption of water-tube boilers fitted with superheaters, and it was arranged to install the type manufactured by the Vulcan company, in which the superheater is placed between the boiler proper and the air preheater, and which only gives a moderate degree of super-

heat. Three boilers were installed, each having 8 square metres grate area, 378.5 square metres heating surface, 93 square metres superheating surface, and a working pressure of 17 atmospheres.

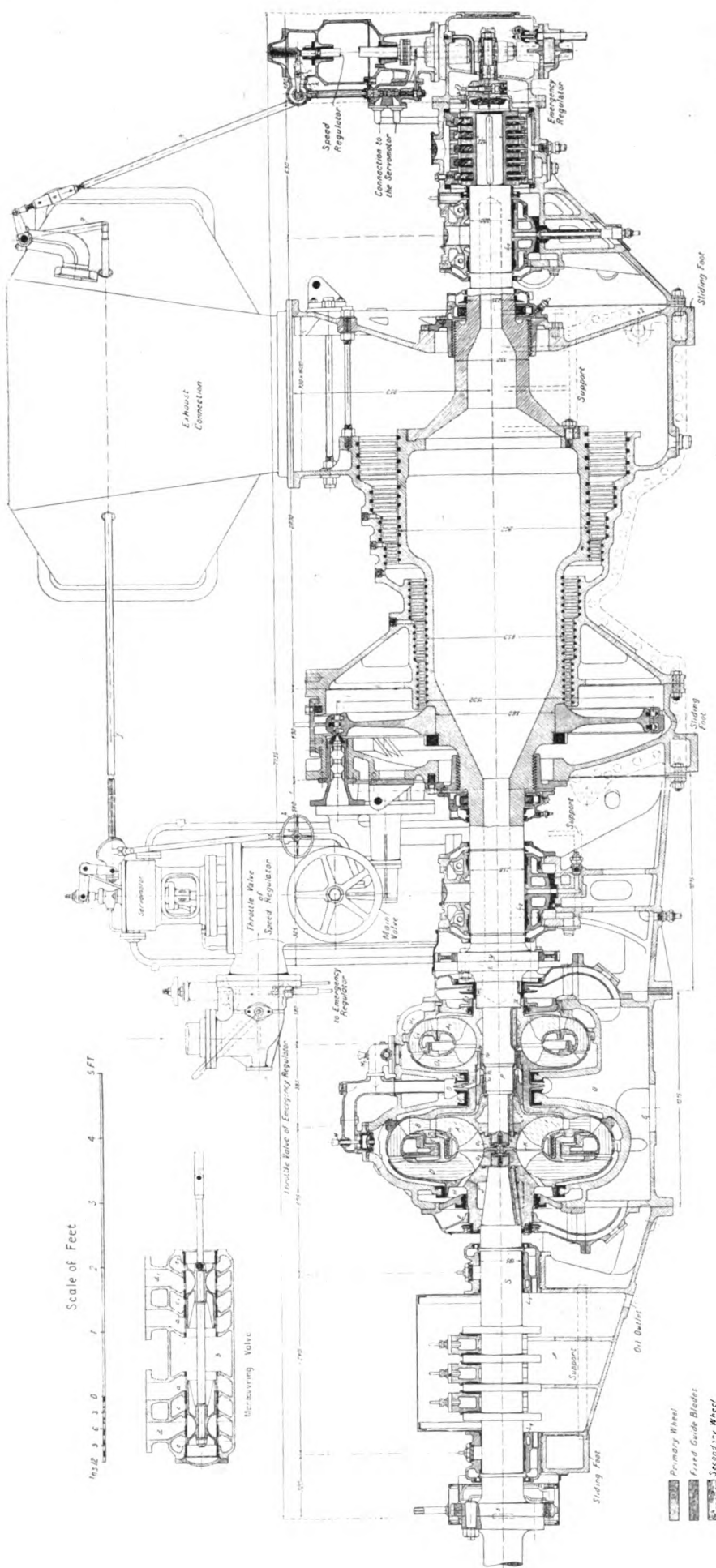
The Main Engines

There were two turbines, each driving a propeller shaft through a Föttinger transformer, as shown in the Supplement. The output of each turbine was 2745 horsepower at 1800 revolutions per minute, and a notable feature in the design of each set is that the casing of the turbine proper and of the Föttinger transformer were bolted together, and thus only three bearings were required, as will be seen on reference to the Supplement. The advantage of this arrangement will be realized by contrasting it with Fig. 1, in which the number of high speed bearings is at least doubled. Further, in order to prevent the ill effects of want of alignment between the high speed bearings of the turbine and the primary wheel of the transformer a piece of fairly flexible shaft had to be introduced. The separation between the casings would, no doubt, be of advantage if the Föttinger transformer were placed near the propeller, when a smaller shaft could be used from the turbine to the propeller.

The erection at the works offered no difficulties, and it was much assisted by the self-centering of the respective turbine and Föttinger transformer casings. It was important that the bearings of the secondary wheel of the transformer should be accurately centred with reference to the primary wheel, and this was affected in the works by means of a cast iron test shaft. A small error between these two was not, however, of vital importance, either as regards efficiency or reliability; first, because the glands were of small diameter and any play due to wear was of small consequence; and secondly, because rubbing did not affect the running, as had been proved by experience. The various parts having been satisfactorily erected at the works, they were separated and sent to the ship for re-erection, which was carried out without any difficulty. In fixing to the ship's frame the following points had to be attended to. The temperature expansion of the turbine case was

about 3 mm. and the expansion of the transformer case was practically negligible. The exhaust portion of the turbine casing was bolted down to the frame with fitting bolts, and brackets were placed at each end of the turbine, and also at the back end of the secondary wheel of the transformer, and to allow for the expansion these brackets could slide, the bolts passing through oval holes. The rotor of the primary wheel of the transformer also shifted slightly with temperature; that is to say, the coupling flange of the primary was displaced about 1 mm. from left to right—see Supplement—on attaining the working temperature. This displacement was taken care of in the erection by fixing the bearing of the secondary so that the primary wheel stood, when cold, 1 mm. to much to the right. Inasmuch as the machine was fixed at the turbine end, the thrust of the propellers was taken at this point, and it was here, so as to speak, that the turbine and propeller thrusts met. The rotor of the steam turbine consisted of a Curtis wheel of 1500 mm. mean blade diameter, followed by a drum carrying thirty-two reaction stages, divided up into seven groups. The turbine was designed for a 94 to 95 per cent vacuum. The mean speed of the blades in the Curtis wheel was 141.4 m. per second, and that of the last row of blades of the reaction portion 109 m. per second. The Curtis wheel and the drum were made of forged steel and the casing was of cast steel. Owing to the favorable ratio between the steam speed and the blade speed of the Curtis wheel the steam could be expanded in the nozzles down to three atmospheres, and the temperature was reduced to 135 degrees Cent. at this point.

The Curtis wheel and its blades were of the usual type, and owing to the high speed of the turbine a single wheel was sufficient. This allowed of the removal of the top casing in one piece, exposing for inspection the whole of the rotor and the shaft labyrinth packings. The turbine bearings had spherical seats and were forced lubricated. The governor and the safety governor, as originally designed, ran at the same speed as the turbine, but after the trial trip a modification was made, and the detailed



arrangement can be gathered from the Supplement.

The centrifugal governor had a vertical axis and actuated a valve supplying oil under pressure to the servomotor in a well-known manner. The governor moved this valve through a lever *k*, the fulcrum *i* of which could be shifted by means of the rod *r* and bell crank *g* by altering the length of the rod *f*, which could be effected by means of the hand wheel *l*. The speed could thus be fixed at any speed between 1000 to 500 revolutions per minute, and at whatever speed the governor was thus fixed by the engineer the turbine was governed should a change of load occur.

As a final measure of security, an emergency governor of the shaft type was provided—as shown in the Supplement—acting on the special valve—also shown in the drawing. The main valve was balanced and could be completely closed in $4\frac{1}{2}$ revolutions.

With the arrangements described changing from full power ahead to above, the handling of the turbine was a simple matter, and it was only when full power astern that the main stop valve had to be closed, and thus the arrangement was the same as that which obtains with reciprocating steam engines.

Transformer Simplified

As regards the transformer, the general design is the same as has often been described, but simplified in certain directions. Thus, there was only one secondary wheel *D*₁, and only one set of guide blades *C*₁ between this wheel and the reversing primary wheel *A*₁. The simplification was possible owing to the small ratio of transformation 4 to 1, and notwithstanding the smallness of the diameter of the reversing wheel, the ratio of the ahead to the astern power was 70 per cent., which was considered ample.

Moreover, the small volume of the reverse wheel casing was soon filled with water, and thus the time of reversal was much reduced. Another alteration was that the first ahead secondary wheel *B*, and with it all primary and secondary wheels, were made in one piece, which permitted the following method of erection:

The spring rings *m* were first placed on the primary shaft *P*—Supplement—then followed the astern primary wheel *A*₁ and the gland *n*. Over the latter were then pushed on in one piece the wheels *B* and *D*₁, viz., the first forward secondary wheel and the astern secondary wheel. Then followed the ahead primary wheel *A*, slipped over the front end of the primary shaft and fixed thereto by a set screw head *o*₁. The flange *p* of the wheel *B* was then

bolted to the flange of the ahead secondary wheel D, which was secured to the secondary shaft S by a screw α_2 . In this way primary and secondary shafts with their respective wheels formed one piece, which could be landed into the bearings. The total weight was only 2000 kilos., and when in position it had only to be coupled up to the turbine shaft.

A further simplification was the arrangement of the water channels for collecting the leakage water from glands E and F and E_1 and F_1 through conduits of ample size into a chamber O in the casing of the runners which had an opening G discharging the water into a tank placed under the transformer. From this tank the water was returned by a special pump.

A section of the manoeuvring valves is shown in the left-hand top corner of the Supplement. The opening a is connected to the ahead portion of the transformer, also to the space b , which is in communication with a_1 , which is connected to the astern portion of the transformer. The space b empties into the transformer tank. At the same

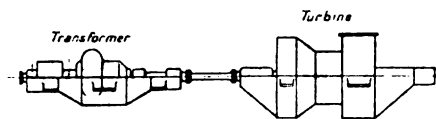


Fig. 1

time the spaces c and c_1 , which are under the pressure of the pump, are shut off by the valve body. Similarly, the spaces d and d_1 are connected to the chambers H and H_1 , which are in communication through the valve to the annular spaces e and e_1 , which latter are connected to b and b_1 by passages in the casing.

The casing can therefore be emptied by either the main outlets N and N_1 —shown in Fig. 2—by the intermediary of the connected annular spaces a and a_1 , or by the filling chambers H and H_1 .

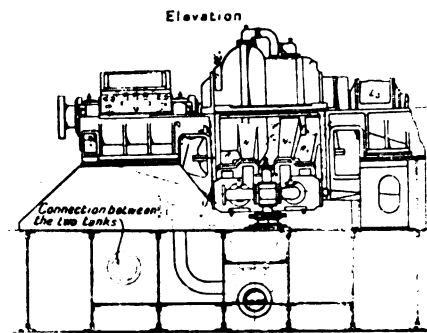


Fig. 2

combined with the interconnected annular spaces e and e_1 and the passages R and R_1 —shown in Fig. 2. The valve was shifted by hand by means of a lever on the starting platform. There were three positions for this lever, viz., ahead, astern and neutral. The extreme position of the lever to the

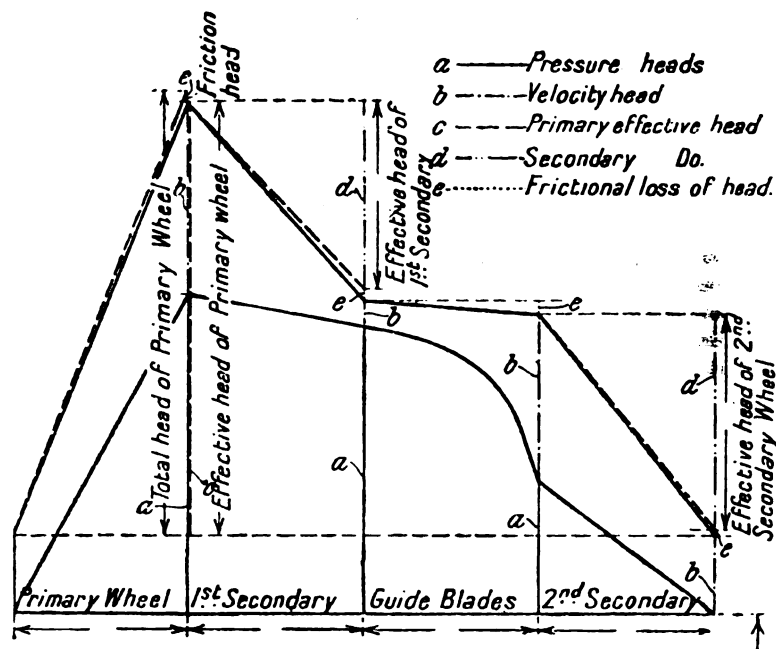


FIG. 3

right—as shown in the Supplement—put the ahead transformer into operation, and the extreme position to the left connected the astern transformer.

Loss of Head Due to Friction

Various particulars as regards the head, the water velocity, and the loss of head due to friction in the ahead transformer, are given in Fig. 3. In some slow-speed water turbines, owing to great changes in water velocity, a pressure less than that of the atmosphere may obtain. This does not occur in these transformers, and in any case can be obviated by a proper choice of pressure produced by the "make-up" pump. It will be observed that the pressure of the leak water returned by the make-up pump was four atmospheres. From the diagram given in Fig. 3 the pressures in various parts of the ahead transformer can be obtained, and are given in Fig. 4, at a time when the effective horsepower was 3100. From this diagram the amount of axial thrust can be obtained. That due to the primary wheel tended to pull the wheel into the transformer, and was partly balanced by the steam turbine thrust. The axial thrust of the secondary wheels tended to push the transformer outwards, and the major portion of it was balanced by the propeller thrust.

Each transformer set had its own tank. These tanks were separated by the keel plate of the boat, but could be connected by means of a sluice valve, and normally this valve was open. The connecting pipes were made as short as possible, and they were so arranged as to allow for heat expansion. The make-up pump had a short suction connected to the transformer tank. This

pump was a single-stage centrifugal, driven direct by a two-wheel Curtis turbine of 400 mm. diameter, and governed by admitting steam to one, two, or three nozzles. There was also an emergency valve in case the speed or pressure exceeded certain fixed limits.

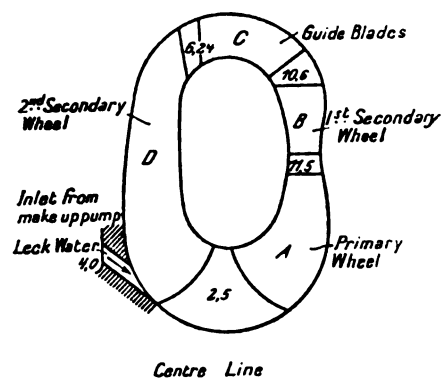
The pump ran at 3500 revolutions per minute, and 14 horsepower was required. During rapid manoeuvring it was desirable to increase the speed, and at the trials this sometimes reached 4500. One pump was sufficient to deal with both transformers, but in this case the speed had to be increased to 4800 revolutions per minute.

TABLE I.

1. Steam pressure on the engine side of the superheater.....	16.5 atm.
2. Steam temperature on the engine side of the superheater..	242.0 deg. Cent.
3. Heat content of the superheated steam..	697 cal. per kilo.
4. Steam pressure in front of nozzles....	13.06 atm.
5. Steam temperature in front of nozzles..	231 deg. Cent.
6. Back pressure in condenser	0.053 atm.
7. Shaft horsepower...	4620
8. Total steam consumption of the main engines	25,600 kilos. per hr.
9. Addition for turbo dynamos	200 kilos. per hr.
10. Total flow from condenser: Q.....	25,800 kilos. per hr.
11. Temperatures of the condense Q in compartment 1 of the hot-well: t_1	30 deg. Cent.
12. Temperature of the feed water before passing pre-heater: t_0	50 deg. Cent.
13. Temperature of the feed-water after passing pre-heater: t_1 ...	95 deg. Cent.
14. Increase of temperature of the feed-water: $t_2 - t_1$	45 deg. Cent.
15. Steam pressure in pre-heater	1.43 atm.
16. Steam content of exhaust steam: q_1 ...	606 cal. per kilo.
17. Temperature and heat content of the condense of the auxiliary machines	104 cal. per kilo.

18. Heat supplied by the condense of the auxiliary machines. 502 cal. per kilo.
19. Weight of condense for auxiliary machines from the equation:
 $Q(t_2 - t_2)$ 2540 kilos. per hr.
20. Total feed: $Q + q$ 28,340 kilos. per hr.
21. Heat supply to hotwell from the condense: Q_1 774,000 cal. per hr.
22. Heat supply to the hotwell from the condense of the auxiliary machines: q_1 264,200 cal. per hr.
23. The sum of both heat quantities (21 and 22) 1,038,200 cal. per hr.
24. Heat content to total feed $Q + q$ on entering pre-heater: $(Q + q)t_2$ 1,416,000 cal. per hr.
25. Heat produced in the transformer: $X = (Q + q)t_2 - (Q_1 + q_1)$ 377,800 cal. per hr.
26. Horsepower loss in the transformer $\frac{X}{632}$ 597.5 H. P.
27. Horsepower in secondary shaft of transformer: N_s 4,620 H. P.
28. Horsepower in primary shaft:
 $N_p = N_s + \frac{X}{632}$ 5,217.5 H. P.
29. Efficiency of the transformers 88.6 per cent
30. Total heat in the boiler steam: $Q J$ 19,750,000 cal. per hr.
31. Heat content of condense from main engines: Q_1 774,000 cal. per hr.
32. Heat content in the exhaust of auxiliary machines 1,539,000 cal. per hr.
33. Sum of $Q_1 + q_1$ 2,313,000 cal. per hr.
34. Heat transmitted to feed water by transformer, and from boilers, $Q J - (Q_1 + q_1)$ 17,437,000 cal. per hr.
35. Saving of coal due to heat produced in transformers transmitted to feed X 2.16 per cent
36. Total efficiency of the hydrodynamic transformer $\frac{Q J - (Q_1 + q_1)}{Q J} \times 100$ 90.76 per cent

Normally the feed water of the boiler was used to supply the transformer, and by this means the greater part of the heat produced in the transformer could be transmitted to the feed water. The connections are diagram-



The figures are pressures above atmosphere

Fig. 4

matically shown in Fig. 5. The greater part of the steam from the boilers was delivered to the turbine by the pipe marked I, and after passing the condenser and air pump was discharged as water into compartment I of the

hotwell, overflowing to compartment 2. A small part of the steam in the boilers went by the pipe 1a to the auxiliary machinery, and thence through the preheater, where it was condensed into compartment 2 of the hotwell,

the delivery valve from the hotwell, and also opened the discharge valve into compartment 2 of the hotwell. When the level fell the vacuum was broken, and these valves resumed their normal position. There were three such suction pipes,

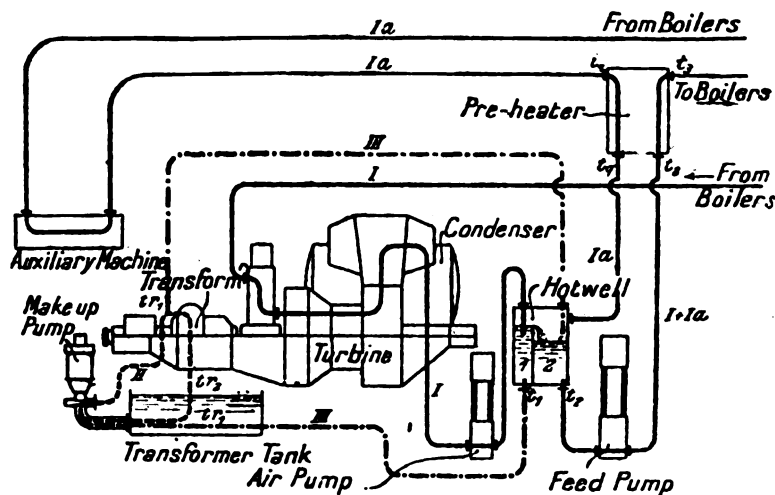


FIG. 5

where it joined up with the first portion, whence it was pumped back into the boiler, passing through the pre-heater on its way.

Leakage from Transformer

As previously explained, leakage from the transformer fell into the transformer tank, and was pumped back by pipe II. Connected to this circuit was circuit 3, which obtained water from compartment 1 of the hotwell, which was mixed in the pump with 2 and thence flowed back along 3 into compartment 2 of the hotwell. The temperature of 2 could thus be regulated by the amount of water allowed to pass through 3, and the heat produced in the transformer was carried to compartment 2 of the hotwell, thence to the boiler. The whole, or any part of the feed water, could be passed through circuit 3, and the temperature of the transformer depended on the amount thus diverted.

To prevent any interruption in the feed water the circulation in 3 had to be rapid, and it was also necessary to keep the height of the water in the transformer tank at a practically constant level. A ball valve would have been unsatisfactory as a method of regulating the flow in circuit 3, and, moreover, the level in the tank varied, depending on whether the transformer was working ahead or astern, or was neutral. The method adopted consists of an ejector, worked by the pump discharge, and producing a vacuum so soon as its suction pipe was closed by the level of the water in the transformer tank rising to the level of the mouth of this pipe. A valve normally held open by a spring was closed by the vacuum so produced and throttled

the openings of which were arranged for the levels required for astern, ahead and neutral positions, and they were put into circuit by the manœuvring lever on the starting platform. This arrangement was found to act perfectly, the water being maintained within 15 mm., representing 80 litres of water. The circulation of water or steam in the various pipes was as follows—Pipe 1, 8.33 litres per second; pipes 1 and 1a, 9.73 litres per second. In both transformers there was a circulation of 3616 litres per second, which was not seen, but circuit 2, carrying the leak water, had a circulation of 36 litres per second.

Increase in Temperature

Inasmuch as the loss in both transformers was 720 horsepower, corresponding to 26.2 calories per second, the temperature of the leak water was increased by 3.5 degrees Cent., which was also the difference in temperature between the transformer tank and the transformer itself. Calculations are given showing that the mean temperature under these conditions of the transformer water is 71.1 degrees Cent., and it was found that at this temperature the efficiencies improved.

The increase of temperature of that portion of the feed which passed through the transformers gave a means of calculating the efficiency of the transformer, as will be seen by the following:—Let the flow in circuit 1 be denoted by Q , and that in circuit 1a by q . Further, let iq be the heat per pound contained in the exhaust of the auxiliary engines and tq the temperature of the condense of this exhaust steam, and let t_2 and t_3 be temperatures of the feed before and after

passing through the pre-heater. Then
 $(Q + q) (t_3 - t_2) = q (t_2 - t_1)$
 whence

$$a = \frac{Q (t_3 - t_2)}{(t_2 - t_1) - (t_3 - t_2)}$$

The following quantities of heat flowed into the second compartment of the hotwell:—

- (1) The water heat of the main engines, together with that of the turbo-dynamos = $Q t_1$.
- (2) The water heat of the condense of the auxiliary machinery = $q t_2$.
- (3) The heat produce in the transformer and transmitted to the feed water = X .

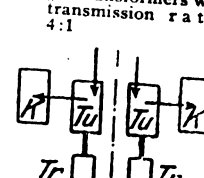
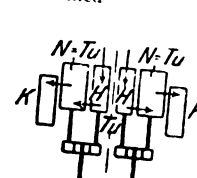
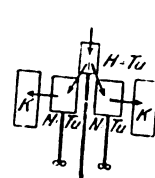
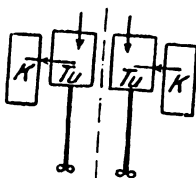
The sum of these quantities of heat must be equal to the heat flowing out of compartment 2, viz:—

$$(Q + q) t_2$$

Hence

Name of ship.....	Kaiser.	Caesarea.	Normannia.	Koenigin Luise.
Date of trial.....	Sept. 9, 1905	January, 1911	Feb. 23, 1912	Sept. 26, 1913
Length between perpendiculars, m.....	92.00	86.5	88.5	83.8
Greatest beam, m.....	11.65	11.87	10.9	11.78
Draught, m.....	7.20	7.26	7.15	7.15
Water displacement, cu. m.....	1900	1990	1864	1720
Speed of ship, knots.....	20	20	19.68	20.1
Type of boilers.....	3 water-tube boilers, Yarrow-Vulcan	2 double-ended cylindrical boilers	1 double-ended and 1 single-ended cylindrical boilers	3 water-tube boilers with superheaters, type Vulcan
Boiler pressure, atm.....	14.0	11.25	11.25	17.0
Conditions of draught.....	Howden plant with air pre-heater	Closed heating space	Closed heating space	Howden plant with air pre-heater
Superheat (difference compared with temperature of saturation).....	32	31.3	28	Approx. 35 deg. C.
Grate surface, sq. m.....	1696	1200	945	1135
Heating surface, sq. m.....	Curtis-A. E. G., 5 Curtis wheels and 21 pressure stages on every shaft. Reversing turbine installed	Parsons pure reaction turbine, 1 high-pressure turbine on the centre shaft, 1 low-pressure turbine on each of the side shafts. Reversing turbines installed	Parsons pure reaction turbine and 1 low-pressure turbine on each of the 2 shaft with reduction gear toothed wheels. Reversing turbines installed	Curtis-A. E. G.—Vulcan, 1 Curtis wheel and 1 reaction drum on each shaft. No reversing turbines. Reversible Foettinger transformers with transmission ratio 4:1
Type of turbines.....				

Connections and number of shafts (Tu = turbine, H = high-pressure, N = low-pressure, K = condenser, Tr = transformer).



Weight of the main engines, including transmitting gear, tons.....	106	500	77	45, including water
Numbers of revolutions, r. p. m.....	552	6760	h. p. 1990, 1.p. 1365, screws 310 5050	Turbines 1827, screws 453 5490
Output, ef. h. p.....	6000	6.75	5.47	5.39
Steam consumption of the main engines alone, referred to the output on the screw shafts, kg./ef.p.s.-h.....	6.2	0.71	0.605	0.595
Fuel (coal) consumption of main and auxiliary engines, referred to the output on the screw shafts, kg./ef.p.s.-h.....	0.72			

$$Q t_1 + q t_2 + X = (Q + q) t_2$$

whence

$$X = (Q + q) t_2 - (Q t_1 + q t_2)$$

Strictly, a correction should be made for radiation, but it is shown that this correction was under 0.28 per cent., and was considered, therefore, to be negligible. It follows that the horse-

power loss in the transformer was—

(632 are the calories equivalent to 1 horsepower hour.)

Table I. gives the results of tests made on October 17, 1913, illustrating the use of the above equations to determine the efficiency of the system. The trial lasted for three hours.

Table II gives a comparison of ships of nearly the same size, having different arrangements of turbine-driven propellers.

Babcock & Wilcox Boilers

The Babcock & Wilcox Co., 85 Liberty St., New York, is installing marine boilers in the battleships Pennsylvania, Oklahoma and Arizona, the torpedo boat destroyers O'Brien, Nicholson, Winslow, Conyngham and Porter and the oil burning steamers Kanawha and Maumee for the Navy Department, together with the army dredges San Jacinto, Sam Houston and San Pedro and the revenue cutter Seminole. The Babcock & Wilcox Co. has also received a large order for oil burners for the battleship Pennsylvania, which will burn

Trans-Pacific Freight

Although insurance rates against war risks on the Japanese lines have been increased 10 per cent, it does not appear as though the European war had as yet interfered with the movement of trans-Pacific freight. The rate on the Pacific Mail steamers has not been advanced, nor is it anticipated by the officials of that line that any difficulties in handling all the export freight that may be offered will be experienced. There are three big Japanese lines operating from our west coast, viz., the Japanese Steamship Co., which connects at Seattle with the Great Northern and the Northern Pacific; the Toyo Kisen Kaisha Line, which connects with the

oil exclusively. The Pennsylvania is building at the yard of the Newport News Ship Building & Dry Dock Co. Other boiler installations being made by the Babcock & Wilcox Co. are in the ferry boat San Pablo of the Southern Pacific Co., San Francisco, the Hill Liners Great Northern and Northern Pacific, the new passenger and freight steamer building for Chas. R. McCormick & Co. of San Francisco, and the new New York fireboat Wm. J. Gaynor, now ready for delivery.

The steamship Northern Pacific, building at Cramps for the Pacific coast trade, was launched Oct. 17.

railways that have their terminals at San Francisco, and the Oriental Steamship Co., which connects with the Chicago, Milwaukee & St. Paul railroad at Tacoma.

Naval Constructor David W. Taylor, U. S. N., will succeed Chief Constructor Richard M. Watt as chief of the Bureau of Construction and Repair, Navy Department, on Dec. 13. It is believed that the new position of industrial manager has been or will be offered to Chief Constructor Watt, as Secretary Daniels, of the Navy Department, is desirous of having him inaugurate his new system of industrial managers for navy yards.

American Ship Building Co.

*Its Annual Report Shows the Company to be in Satisfactory
Financial Condition and in Excellent Shape to Care for Business*

THE annual report of the American Ship Building Co. appended herewith is self-explanatory and all comment is superfluous. The company has reduced its liabilities \$2,000,000 during the past year and has readjusted its surplus by subtracting \$683,000 from the market value of securities and \$439,136.02 for the abandonment of the West Bay City plant. Its corrected surplus is of July 1, 1913, is therefore \$5,438,430.53. The earnings for the year were \$712,061.75, with \$192,757.05 written off for maintenance and \$240,000 for reserve the net income for the year was \$279,304.70. Dividends for two quarters took \$276,500 of the sum, leaving a balance of \$2,804.70 which was carried to surplus.

The surplus for the year ending June 30, 1914 is therefore \$5,441,235.23.

President Smith in his report makes the following significant statement:

"Owing to the improved rules and regulations adopted by the vessel owners themselves, and the carrying by them of 25 per cent of the insurance, a much more careful operation of the vessel as to loading and navigation has resulted, and in consequence the repair work of the company has been considerably de-tailed."

That is certainly high testimony for the Lake Carriers' Association and its policy of separate courses for up-bound and down-bound vessels and the earnest efforts of the Great Lakes Protective

Association to minimize accidents by assuming part of the risk.

The report to the stockholders is as follows:

"Owing to the general business depression which has prevailed for the last two years, especially in the iron and steel trade, the business on the Great Lakes for the year ending June 30, 1914, has been unsatisfactory. We believe that when the steel business revives, business on the Great Lakes will also be very much better, but, in view of the prevailing and continued depression, the Directors have deemed it unwise to make any declaration of dividends for the fiscal year ending June 30, 1914, in excess of the 3½ per cent already paid.

"There have been a number of changes in the personnel of the officers of the company. Henry A. Christy was elected chairman of the board in December, 1913. Russell C. Wetmore, vice president and treasurer, died in January, 1914. O. J. Fish, assistant treasurer, was chosen treasurer in place of Mr. Wetmore, deceased. Alfred G. Smith was elected general manager of the company in July, 1914, to take the place made vacant by the resignation of R. B. Wallace. Edward Smith, for many years a director of the company and president of The Buffalo Dry Dock Co., was chosen president of this company, September 23, 1914, to take the place made vacant by the resignation of James C. Wallace, who had ably filled the office for the past ten years. On the same day, M. E. Farr, for many years the president of The Detroit Ship-building Co., was chosen vice president in place of Mr. Edward Smith, who resigned.

"An appraisal of the properties of the company and its subsidiary companies was made during the year by The Manufacturers' Appraisal Co., and the values placed on the properties were in excess of the book values.

"The financial condition of the company is most satisfactory. During the past year its liabilities have been reduced over \$2,000,000; thus putting it in most excellent shape to await the revival of business.

CAPITAL STOCK

Remains unchanged from last year, viz:	
Authorized:	
Preferred	\$15,000,000
Common	15,000,000
Total	\$30,000,000
Issued:	
Preferred	\$ 7,900,000
Common	7,600,000
Total	\$15,500,000

CONSOLIDATED BALANCE SHEET AS OF JUNE 30, 1914.

ASSETS.			
Plans and property as appraised by Manufacturers Appr. Co.....		\$12,056,238.71	
Good-will, patents, as per books.....		6,684,292.25	
Investments as per books:			
Steamship stocks	\$ 351,500.00		
Bonds	751,735.00		
Stocks, subsidiary company.....	600,000.00		
Notes maturing after June 30, 1915.....	169,973.64	1,873,208.64	
Inventory and current assets:			
Inventory, materials, supplies and scrap.....	\$ 530,331.44		
Uncompleted contracts	4,959.18	535,290.62	
Current assets:			
Notes receivable maturing before July 1, 1915.....	\$ 508,108.96		
Accounts receivable, including unbilled day work.....	1,060,126.09		
Accrued interest	7,751.57		
	\$1,575,986.62		
Less: Reserve for doubtful accounts and notes.....	91,061.54		
	\$1,484,925.08		
Cash on hand and in bank.....	587,579.48	2,072,504.56	
Advanced to subsidiary company.....		351,397.01	
Deferred charges to operations.....		57,743.85	
		\$23,630,675.64	
CAPITAL AND LIABILITIES.			
Capital stock: 7 per cent non-cumulative preferred			
Authorized \$15,000,000	Issued	\$7,900,000.00	
Common, Authorized 15,000,000	Issued	7,600,000.00	\$15,500,000.00
Funded indebtedness: 5 per cent purchase money mortgage bonds on Buffalo property, \$50,000 due yearly on April 1....			250,000.00
Current liabilities:			
Notes payable	500,000.00		
Accounts payable	172,851.90		
Accruals: Taxes	65,125.75		
Liability insurance	3,241.91	741,219.56	
Reserves:			
Maintenance	\$ 428,117.97		
Uncompleted construction	19,058.65		
Bond discount	10,000.00		
Fire insurance	103,583.00	560,759.62	
Appreciation: Real estate, buildings, dry docks, etc., as per Manufacturers' Company appraisal		1,137,461.23	
Surplus: Balance July 1, 1913.....	\$6,561,366.55		
Adjustments applicable to prior periods:			
Loss occasioned by abandonment West Bay City plant	\$439,136.02		
Depreciation market value of securities.....	683,800.00	1,122,936.02	
Adjusted balance July 1, 1913.....		\$5,438,430.53	
Surplus for year ending June 30, 1914:			
Earnings for year before deducting maintenance and depreciation	\$712,061.75		
Less maintenance	\$192,757.05		
Less reserve for maintenance.....	240,000.00		
	\$432,757.05		
Net income for year ending June 30, 1914.....	\$279,304.70		
Less preferred dividends for two quarters.....	276,500.00	2,804.70	5,441,235.23
			\$23,630,675.64

Note:—There is a contingent liability for notes amounting to \$100,000 of the Western Dry Dock & Ship Building Co., guaranteed by the American Ship Building Co., which has been paid since the close of the fiscal year.

PROPERTY OWNED AND CONTROLLED

Cleveland, O.
Construction yard Boiler shop
Machine shop Three dry docks
Foundries

Lorain, O.
Construction yards Boiler shop
Two dry docks Machine shop

Detroit, Mich.
Machine shop Brass works
Boiler shop Two dry docks
Foundry

Wyandotte, Mich.
Construction yard Machine shop

Superior, Wis.
Construction yard Two dry docks
Machine shop Self-propelled repair
 outfit with electric
 welder

Chicago, Ill.
North Plant:—
Construction yard Three dry docks
South Plant:—
Construction yard One dry dock
Machine shop

Milwaukee, Wis.
Machine shop Two dry docks
One floating dock

Buffalo, N. Y.
Construction yard Three dry docks
Machine shop

Port Arthur, Ontario, Can.
Construction yard One dry dock
Machine shop Boiler shop
Foundry

Condition of the Property

"The condition of the property at the various plants has been maintained; and necessary, but rather large expenditures have been made to change and enlarge the dry docks, which enlargement has been requisite owing to the increased size of the vessels constructed on the Great Lakes.

VESSELS BUILT

Plant.	Vessels built.	Carrying capacity net tons.
Lorain	8	53,700
Cleveland	1	9,500
Port Arthur	6	16,800
Detroit	1	3,100
Total	16	83,100

(Carrying capacity is based on 19 feet draught.)

Summary and Prospects

"Owing to the improved rules and regulations adopted by the vessel owners themselves, and the carrying by them of 25 per cent of the insurance, a much more careful operation of the vessels as to loading and navigation has resulted, and in consequence the repair work of the company has been considerably curtailed.

"As to the outlook, every effort is being made to exercise the most rigid economy, as, unless conditions improve, the prospects for business for the coming year are not encouraging.

"At the close of the present fiscal year an audit of the company was made by The Audit Co. of New York, and the attached condensed balance sheet and certificate shows the affairs of the company as determined by the Audit Co."

EDWARD SMITH,
President.

Naval Architect and Marine Engineers

The twenty-second annual meeting of the Society of Naval Architects and Marine Engineers will be held in Assembly room No. 1, Engineering Societies building, New York on Dec. 10 and 11 followed with a banquet on the evening of the 11th in the Astor gallery of the Waldorf-Astoria. Following is the preliminary list of papers which has been promised but is not to be regarded as final:

"International Conference on Safety at Sea," by Hon. E. T. Chamberlain.

"Some Experiments with Models Having Radical Variations of After Sections," by Naval Constructor D. W. Taylor, U. S. N.

"Expansion and Contraction of Certain Dimensions and their Effect upon Resistance," by Prof. H. C. Sadler.

Subject not yet decided upon, by Naval Constructor J. G. Tawresey, U. S. N.

"Stability of Vessels as Affected by Damage Due to Collision," by William Gatewood.

"The Application of Electric Propulsion to Battleships, together with the Experience Gained in the Jupiter," by Lieutenant S. M. Robinson, U. S. N.

"The Automatic Tension Engine, A New Marine Implement," by Spencer Miller.

"Subdivision Rules as Adopted by International Conference on Safety at Sea," by James Donald.

"The Present Status of Marine Diesel Engine Installation Engine Installations," by W. R. Haynie.

"The Thermodynamics of the Marine Oil Engine," by John F. Wentworth.

"The Behavior of Riveted Joints under Stresses," by James E. Howard.

"Recent Developments in Submarine Signalling," by J. B. Millet.

"Fire Protection of Ships," by W. C. Teague.

Byerlyte Ship Flooring

One of the most remarkable compositions for ship flooring is Byerlyte, manufactured by Byerley & Sons, 2484 West Fourth street, Cleveland. It is fast finding its way aboard all sorts of floating craft owing to its ability to withstand vibration without cracking. This peculiar characteristic is due to its resilient and expansive qualities. It seems to have about enough give to it to meet the varying conditions encountered aboard ship, such as changes in temperature and the strains to be met with in heavy weather.

The United States government has just covered a portion of the bridge of the battleship Michigan with it and has specified it for a dipper dredge which it is now building. On the great lakes it is giving eminent satisfaction, the floor-

ing having been laid on the following steamers: The Grand Rapids and Puritan, of the Graham & Morton Transportation Co.'s fleet; the Richardson, McCullough, Underwood, Chemung and Owego, of the Erie Railroad Lake Line fleet; the Tashmoo, of the White Star Line; the Victory, Mather, Jupiter, Stone, Neptune, Cygnus, Hydrus, Sirius, Cephus, Hemlock, Calumet, Pathfinder, of the Interlake Steamship Co.'s fleet, and the steamer Truesdale, of Brown & Co.'s fleet, Buffalo. It has also been installed on the United States government steamer Hannibal, the Lightships 96 and 98, and the Kate Adams, of the Memphis & Arkansas City Packet Co.'s fleet.

It is announced that the fleet of the Mexican Petroleum Co., consisting of six large steamships and several smaller ships, all of recent construction, will be transferred from British to American register. The tank steamers owned by the Petroleum Carriers, Ltd., a subsidiary company, are as follows: C. A. Canfield, 6,350 registered tons; Chas. A. Harwood 3,178 tons; Edward L. Doheny, 6,170 tons; Herbert G. Wylie, 4,293 tons; J. Oswald Boyd, 1,606 tons, and the Norman Bridge, 4,289 tons.

The wrecked steamer H. M. Hanna Jr., which went on the rocks at Point Aux Barques, Lake Huron, during the great November storm last year and which was subsequently bought by the Reid Wrecking Co., of Port Huron, is now in dry dock at the yard of the Collingwood Ship Building Co., Collingwood, Ont. The steamer has been sold by the Reid company to Canadian parties and after repairs on her are completed she will be transferred to Canadian register. It is also announced that she will be renamed Sir Wilfred Laurier.

Bids will be opened about Oct. 30, by Col. Jervey, U. S. government engineer in charge of the Cincinnati district, for the construction of two steel deck barges for use on the Kentucky river. Plans and specifications for these barges have been approved.

The New York Ship Building Co. has taken contract for a tank steamer for the Gulf Oil Co., involving about 3,000 tons of steel.

The Canadian Shipbuilding & Dry Dock Co., Ltd., Owen Sound, Ont., has been incorporated with a capital of \$2,000,000. The company will engage in a general shipbuilding and navigation business consisting of the construction and operation of vessels and dry docks.

Port Development

A Comprehensive Exposition of the Relative Duties of Federal, State and Municipal Authorities

By Col. W. M. Black, Corps of Engineers, U. S. A.

TO understand the duties of Federal officials in questions of this class, a knowledge of the responsibilities and powers of the general government is necessary.

Remembering the burdens caused in Colonial days by the restrictions then placed on commerce by law, the framers of the constitution wisely included in the powers surrendered by the state to the general government the entire control of interstate commerce, as enumerated in the first and third articles.

Early in the Nation's life, the generalities of the fundamental law had to be interpreted and applied to particulars by the Congress and justices of the Supreme Court of the United States and providentially, as it now seems, the justices of that court have been men of wide vision. From the beginning, both the laws enacted and the interpretation made of those laws have been in harmony, and have consistently ruled that the powers of the United States over the instruments of interstate commerce are supreme. Late decisions have simply served to emphasize the wide extent of the field of action of those powers.

The local laws of the various states relating to the navigable waters differed in accordance with the origin from which sprung the original settlers. The 13 colonies derived their laws and ideals of law from England. In the states formed from the territories acquired by purchase, or as the results of a successful war, the Spanish law prevailed. In all, the control of the navigable waters had been vested in the crown as a trust for all of the people and the points of difference in the laws related mainly to property boundaries and riparian rights. In the transfer of sovereignty, this right of control had become a part of the powers of the people, at first in the trust of the separate colonies, but later surrendered by the states, their successors, to the nation.

When new states were formed from the acquired territory the provisions of the constitution were made applicable to them. Thus, the rights of navigation have been made common to all of the people and the laws enacted for the preservation of these rights are national

laws enacted by Congress. The several states may and do enact legislation regarding the navigable waters within their limits and such laws are valid in so far as they do not conflict with the laws of the Nation. In many cases, Congress has acted slowly in the exercise of the national powers and even today the full extent of these powers has not been covered.

Navigable Waters

Under the English precedent the navigable waters were limited to those in which the tide ebbs and flows. It was early perceived that such a limitation could not be applied to the waterways of the United States and the Supreme Court had to make a new definition. Perhaps the best and most comprehensive definition is that given by Mr. Justice Field in the Daniel Ball case, 10 Wall., 557, in which he states:

"Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade or travel on water. And they constitute navigable waters of the United States within the meaning of the acts of Congress, in contradistinction from the navigable waters of the states, when they form in their ordinary condition by themselves, or by uniting with other waters, a continued highway over which commerce is or may be carried on with other states or foreign countries in the customary modes in which such commerce is conducted by water."

In *Gilman vs. Phila.*, 3 Wallace, 713, Mr. Justice Swayne delivering the opinion of the court said:

"Commerce includes navigation. The power to regulate commerce comprehends the control for that purpose, and to the extent necessary, of all the navigable waters of the United States which are accessible from a state other than those in which they lie. For this purpose they are the public property of the nation, and subject to all the requisite legislation by Congress. This necessarily includes the power to keep them open and free from any obstructions to the navigation, interposed by the state or otherwise; to remove such obstructions when they exist, and to provide, by such sanctions as they may

deem proper, against the occurrence of the evil and for the punishment of the offenders. For these purposes Congress possesses all the powers which existed in the states before the adoption of the National Constitution, and which have always existed in the Parliament in England.

"It is for Congress to determine when its full power shall be brought into activity, and as to the regulations and sanctions which shall be provided."

In *Stockton vs. The Baltimore & New York Railroad Co.*, (32 Fed. Rep., 9), Mr. Justice Bradley, in rendering the opinion of the court, in answering the contention that although Congress may have power to construct roads and other means of commercial communication between the states, yet this can only be done with the concurrence and consent of the states in which the structures are made, said:

"If this is so then the power of regulation in Congress is not supreme; it depends on the will of the state. We do not concur in this view. We think that the power of Congress is *supreme* over the whole subject, unimpeded and *unembarrassed* by state lines or state law; that in this matter the country is one and the work to be accomplished is national, and that state interests, state jealousies and state prejudices do not require to be consulted. In matters of foreign and interstate commerce there are no states."

Comprehensive as this is, later decisions have given even a wider scope to the powers of the people in the preservation of the navigable waters as in the case of the *United States vs. Rio Grande Dam & Irrigation Co.* (174, U. S., 690), in which the court said:

"Although this power of changing the common law rules as to streams within its dominion undoubtedly belongs to each state, yet two limitations must be recognized: First, that in the absence of specific authority from Congress a state cannot by its legislation destroy the right of the United States, as the owner of lands bordering a stream, to the continued flow of its waters; so far at least as may be necessary for the beneficial uses of the government property. Second, that it is limited by the superior power of the general government to secure the uninterrupted navigability of all navigable streams within the limits of the United States. In other words, the jurisdiction of the general government over interstate commerce and its natural highways vests in that government the right to take all needed measures to preserve

Paper read before National Association of Port Authorities, Baltimore, Md., Sept. 8, 1914.

the navigability of the navigable water courses of the country even against any state action."

Decisions restricting the power of the states to make grants of submerged lands to private parties or to corporations are found in *Illinois Central R. R. Co. vs. Illinois*, 146 U. S., 387, and in *The people of the State of California vs. Southern Pacific R. R. Co.*, Superior Court of the State of California.

In the administration of the laws relating to navigable waters, the question of the ownership of the submerged lands does not enter. The rights of navigation extend to the high water mark of tidal waters and to the ordinary water line of non-tidal waters, irrespective of such ownership, and the use which an owner of lands submerged by the navigable waters can make of his property must be such as does not interfere with the prior rights of navigation. Naturally, there must be authority vested in some one to decide whether a proposed use of the submerged lands can be permitted. In the acts of March 3, 1899, June 13, 1902, August 18, 1894, May 9, 1900, and March 3, 1905, are found the general laws for the protection of the navigable waters. A general bridge law exists in the act of March 23, 1906, and one relating to dams in the act of June 28, 1910. All constructions in or changes of capacity of navigable waterways are forbidden unless specifically authorized by Congress or in certain cases by the Secretary of War to whom Congress has deputed a limited discretionary authority.

For example, minor constructions on the shores or in the beds of navigable waterways may be authorized under permits from the Secretary of War. Further, Section 11 of the Act of March 3, 1899, provides that:

"That where it is made manifest to the Secretary of War that the establishment of harbor lines is essential to the preservation and protection of harbors he may, and is hereby, authorized to cause such lines to be established, beyond which no piers, wharves, bulkheads, or other works shall be extended or deposits made, except under such regulations as may be prescribed from time to time by him."

Harbor lines usually consist of two bounding lines along the shores of a waterway. That nearer the shore marks a limit for solid fill and is called a bulkhead line. The other marks a limit for open constructions beneath which the water can circulate and is termed a pierhead line. In certain cases the two are made coincident. In others, only a pierhead or a bulkhead line is established. In some cases the establishment of one or both lines is coupled

with the proviso that no construction shall be made between the shore and the line or lines, excepting under a permit from the Secretary of War in which the nature, extent and location of the structure shall be specified.

Establishment of Harbor Lines.

The establishment of harbor lines grants no privileges of ownership, but simply signifies that within the limits set by the lines there is no objection made by the United States, as trustee for the people, to the use of these submerged lands for the class of structures authorized. The establishment of harbor lines is in the nature of the issuance of a general permit. Within the areas bounded by the harbor lines the uses of the submerged soil may be still further regulated by state authority.

The lines as established are subject to change where in the opinion of the Secretary of War the needs of navigation so require. (See *Phila. Co. vs Simpson*, 233 U. S., 605). Further, in a decision dated September 27, 1910, the Attorney General of the United States held that the establishment of harbor lines does not remove the waters enclosed between them and the shore from the jurisdiction of the United States for such use as may be required for the aid of navigation, so long as the owner of the submerged land had not filled in "thereby practically removing his land from the body of the river and making it a part of the upland." He made no decision as to a case in which the fill had actually been made.

The powers of the United States in the control and improvement of its navigable waters is paramount over all individual or corporate rights as riparian owner. In a decision rendered June 2, 1914, in the District Court of the Northern District of Illinois, in the case of *Franz Tempel vs. United States*, Judge Carpenter states:

"The title to the bed of the North Branch of the Chicago river in front of Tempel's property, whether in the state of Illinois or Franz Tempel, was subject to an easement in favor of the United States government, and that any damages, caused by the dredging of said bed, to the bank along the shore line of said Tempel, are only incidental and consequential, for which the United States government is not answerable in damages:

"Said Tempel as a riparian owner along a navigable stream must himself bear the loss of any wearing away of his bank by erosion;

"The North Branch of the Chicago river in front of Tempel's property being a navigable stream the dredging of the bottom of the river bed by the United States government in 1899 did not constitute a taking within the mean-

ing of the fifth amendment to the Constitution of the United States."

So, also works for the benefit of navigation may be constructed on lands submerged by the navigable waters, and access to upland shore property may be denied by such works without the owner having any right of compensation against the United States.

This entire question is well covered by the following extract from the decision of the Supreme Court of the United States rendered in the October term, 1912, in the case of the *United States vs. the Chandler-Dunbar Water Power Co. et al.*

"This title of the owner of fast land upon the shore of a navigable river to the bed of the river is at best a qualified one. It is a title which inheres in the ownership of the shore and, unless reserved or excluded by implication, passed with it as a shadow follows a substance, although capable of distinct ownership. It is subordinate to the public right of navigation, and however helpful in protecting the owner against the acts of third parties, is of no avail against the exercise of the great and absolute power of Congress over the improvement of navigable rivers. That power of use and control comes from the power to regulate commerce between the states and with foreign nations. It includes navigation, and subjects every navigable river to the control of Congress. All means having some positive relation to the end in view which are not forbidden by some other provision of the Constitution are admissible. If, on the judgment of Congress, the use of the bottom of the river is proper for the purpose of placing therein structures in aid of navigation, it is not thereby taking private property for a public use, for the owner's title was in its very nature subject to that use in the interest of public navigation. If its judgment be that structures placed in the river and upon such submerged land are an obstruction or hindrance to the proper use of the river for purposes of navigation, it may require their removal and forbid the use of the bed of the river by the owner in any way which in its judgment is injurious to the dominant right of navigation. So, also, it may permit the construction and maintenance of tunnels under or bridges over the river, and may require the removal of every such structure placed there with or without its license, the element of contract out of the way, which it shall require to be removed or altered as an obstruction to navigation."

The foregoing shows the nature and scope of the laws of the United States for the protection of the people's rights of navigation. Under these laws the nation improves and maintains the waterways which have to be free and open for the use of all.

Just here arises the distinction between the functions of the national officials and those of the state or municipal officials charged with port

duties. Those of the former relate to the general needs of commerce, those of the latter to the special transfer needs of the particular port. Both are of the highest importance, and there should be no clashing of interests. In its ultimate results any impairment of national interests must be detrimental to the local interests.

In addition to deep, safe and unobstructed channels of entrance and of communication, provided with ample and safe anchorages, the general requirements of a great commercial harbor are:

1. Accommodations for express, passenger and package freight traffic. These should be of ample capacity, located conveniently to railroad terminals and to hotel and shopping centers, and connected therewith by highways unobstructed by railroad grade crossings and provided with facilities for rapid transit.

2. Piers for the direct interchange of traffic between water and railway carriers. These must also be of ample capacity and must adjoin large railroad yard areas, free from vehicular traffic. They should not be located in the heart of a city's water front.

3. Piers for freighters whose cargoes are distributed or received from many different sources. These should be located conveniently to the centers which they serve and should have ample means of access for motor and horse trucks with yard space for temporary storage of such vehicles. If possible they should have ample space for storage of incoming and outgoing freight with space for access to all parts for the instruments of transfer. Also, they should be inter-connected by a railway with connections to trunk lines and possibly to bonded warehouses. The slips should be wide enough to permit of lighter service with other parts of the harbor.

4. Accommodations for pleasure craft, and for ferry service.

5. Ample water front for large manufacturing plants which use water and rail carriers for raw materials and finished products. Such plants requiring large areas for proper development should not be located near the heart of a port.

6. Municipal piers open to all, some of which should be equipped with unloading plant or with coal handling plants for use of manufacturers whose works are located back from a water front.

Individual Development

It is evident that in a port which has grown simply by individual development and not according to a well thought out plan, a wise distribution of the various

classes of traffic is impossible, and an uneconomical arrangement must exist with resulting financial loss. It is also evident that if the water front be divided into small privately owned parcels, the possibility of its proper development is practically nil.

Yet, it is only of recent years that effective steps have been taken toward systematic port organization and development on this side of the Atlantic. Municipal, or state ownership and control of water fronts is essential to this end, and municipal, or state authorities must control.

In the design of new ports or, what is more difficult, the adaptation of the older ports to the modern requirements for the economic movement of the world's products, there is required an exercise of ability of the highest grade.

The proper solution of the problems of transportation is one of the factors in the reduction of the cost of living. This increasing cost of living is a partial measure of the increase of comfort demanded for all classes and to that extent is an index of advancing civilization. From this point of view it is not an inherently bad condition. However, to make its attendant hardships only temporary, and to supply this increasing demand for better living without an undue increase of the burdens of the people, it is necessary to seek all possible means of reducing cost. With each section of the world producing that for which it is economically best fitted, and with the means of transportation and distribution developed to the highest capacity, the burdens of today will be greatly reduced. The port authorities of the world can have a large influence in hastening or retarding the hoped for solution.

Location of Harbor Lines

The establishment of the location of harbor lines has frequently formed a bone of contention between the national authorities and local interests. It is but natural that riparian owners should seek to increase the area and commercial facilities of their property by encroachments on the waterway. At times, this can be permitted without detriment to general interests; at others it must be forbidden. Since the real interests of both the nation and the locality are, in the broadest sense, the same, both the national and local authorities should be able to work in harmony in the establishment or re-arrangement of harbor lines. Experience has shown that where there is no carefully considered local control of a port, the establishment of harbor lines may be really detrimental. Cases can be cited where a short-sighted riparian owner has created solid fill

just as far channelward as was permitted and has covered that fill with his structures, but has later found that he had left himself insufficient pier area with a result of a curtailment of the business capacity of his property. This has been followed by importunate requests for the further movement channelward of the pierhead line.

Co-operation

The remedy for this can be obtained by co-operation between the national and local authorities of the port. It is not always possible to foresee what areas of the port's shore line will be needed for manufacturing plants requiring limited berthing lengths and what areas will be required mainly for pier and slip purposes. Under these conditions, it is possible that one of two courses may be advisable. One, to establish simply a pierhead line which should be the limit of any construction of any kind channelward and then, as each property is to be developed, to have the plans for that development passed upon by the local authorities and construction authorized under a permit from the national authority. Under such a policy the application is made of record and the onus for any short-sighted division of the area in question between upland and pier and slip space is fixed on the property owner. In this connection it may be noted that experience in New York has shown that practically all of the circulation of water in the stream is between the opposed pierhead lines and that the effect of the space between each pierhead line and its corresponding bulkhead line is negligible in so far as the movement of the waters and the effect of such movement on the river bed and banks is to be considered. Where this is the case, open and solid fill piers have identical effects on the regimen of the waterway.

Another course would be not to establish formally any harbor lines but to lay down a theoretical pierhead line for the guidance of responsible officials, which should serve as a limit channelward for all structures for all shore developments and to have the right to make those developments up to that line, after having been properly and duly considered and recommended by local authorities, granted by a federal permit for each individual case.

The operations of port protection and development, like any great public work, illustrate the truth of the Spanish proverb "You can't make an omelet without breaking eggs." Some interests are bound to suffer. Port officials, both federal and local, must form judgment

of the propriety of each project presented from the standpoint of the broad general interests of the nation and of the locality and must be prepared to face pressure and criticism from those whose existing or prospective eggs have to be sacrificed.

Naval Vessels

In an articles showing how the nations at war have suffered in losses of fighting vessels, the Glasgow Herald enumerates the list of those that have so far been disposed of and showing that Germany has felt the strain the most. The article says:

Even adding the three third-class cruisers the destruction of which was announced this week, the British fleet has not sustained the loss of nearly so many vessels as has the navy of Germany. Numerically the German losses are 26, while those of the British are only eight. In actual fighting value, however, the deductions which have to be made from the naval strength of Britain are larger than are represented by a comparison in mere numbers, as the three cruisers lost on Sept. 22 were larger units in the British fleet than were the three cruisers lost simultaneously by Germany in Heligoland Bight. On the other hand, Germany has lost a battle-cruiser of her most modern type, three other cruisers, three submarines, probably nine destroyers, one gunboat and two torpedo boats—so that she has out of action altogether 22 war vessels as compared with the seven lost by Britain. In proportion to the extent of her fleet she has suffered much more severely than Britain has. In the following list, it will be understood, some of the tonnages must necessarily be approximate, as the names of the smaller vessels have not always been made public, while in some cases the exact date on which a vessel was lost cannot be stated with absolute accuracy. It may also be added that, of course, only "combatant" vessels are included, and that unarmed merchant ships sunk or captured are omitted:

GERMAN.

	Tons.
Aug. 4—Torpedo boat blown up by explosion or German mine off Danish coast	160
Aug. 5—Konigin Luise, mine layer, sunk by British destroyer Lance...	2,163
Aug. 9—U-15, submarine, sunk by H. M. S. Birmingham off Heligoland...	500
Aug. 19—Goeben, battleship, interned in Dardanelles	22,640
Aug. 10—Breslau, light cruiser, interned in Dardanelles	4,500
Aug. 27—Kaiser Wilhelm der Grosse, armed merchant cruiser, sunk by H. M. S. Highflyer in South Atlantic...	13,952
Aug. 28—Magdeburg, light cruiser, aground and blown up by Russian fleet	4,500
Aug. 28—Köln, light cruiser, sunk by British fleet in Heligoland Bight...	4,280
Aug. 28—Mainz, light cruiser, sunk by British fleet in Heligoland Bight...	4,232
Aug. 28—Ariadne, light cruiser, sunk	

by British fleet in Heligoland Bight.	2,618
Aug. 28—Two destroyers sunk by British fleet in Heligoland Bight.....	1,000
Sept. 4—Seven destroyers and one torpedo boat reported damaged, and others sunk near Kiel canal.....	3,800
Sept. 12—Speewald, armed merchantman, captured by British cruiser Berwick in North Atlantic.....	3,899
Sept. 13—Hela, small cruiser, torpedoed by British submarine E-9 off Heligoland	2,000
Sept. 14—Cap Trafalgar, armed merchant cruiser sunk off east coast of South America by British armed merchant cruiser Carmania	18,710
Sept. 19—Mowe, gunboat, sunk by H. M. S. Pegasus at Zanzibar.....	650
Sept. 22—Two submarines reported sunk by British fleet in North Sea...	1,000
Total up to date—26 vessels of 93,604 tons.	

BRITISH

Aug. 5—Amphion, light cruiser, sunk by German mine in North Sea.....	3,440
Sept. 3—Speedy, torpedo gunboat, sunk by German mine in North Sea	810
Sept. 5—Pathfinder, light cruiser, sunk by submarine off Scottish east coast	2,940
Sept. 8—Oceanic, armed merchant cruiser, wrecked on Scottish north coast	17,274
Sept. 20—Pegasus, third class cruiser, completely disabled at Zanzibar by German third class cruiser Königsberg	2,135
Sept. 22—Aboukir, third class cruiser, sunk by submarine in North Sea...	12,000
Sept. 22—Cressy, third class cruiser, sunk by submarine in North Sea...	12,000
Sept. 22—Hogue, third class cruiser, sunk by submarine in North Sea...	12,000
Total up to date—8 vessels of 62,599 tons.	

AUSTRIAN

Aug. 17 (about)—Zenta, torpedo cruiser, sunk by French fleet in the Adriatic	2,264
Sept. 10—Torpedo boat reported blown up by mine in Adriatic	160
Total up to date—2 vessels of 2,424 tons.	

JAPANESE

Sept. 21—Torpedo boat, sunk by German cruiser	350
Another torpedo boat reported lost..	350
Total up to date—2 vessels of 700 tons.	

Taking into account warships only, Germany has lost 1 battleship (for the purposes of the war, at least), 5 cruisers, 9 destroyers, 2 torpedo boats, 1 gunboat and 3 submarines; Britain, 6 cruisers and 1 gunboat; Austria, 1 cruiser and 1 torpedo boat. and Japan, 2 torpedo boats. The reduction in fighting power is therefore far larger in the case of Germany than in the case of Great Britain, while in comparison with the powers of the respective fleets the balance is enormously in favor of Britain.

A German McAndrews

The Pall Mall Gazette, London, of Sept. 11, has an article entitled "Ober-Ingenieur McAndrews," which tells of the capture of the German steamer Kronprinzessin Cecilie of which our readers have noted the report on the daily press. The extract we give relates to the devotion of the German chief engineer to his machinery, and of his effort to have it cared for after he should be gone. The references will be entirely clear to all who have read Kipling's fine poem about marine machinery, entitled "McAndrew's Hymn."

But the Kronprinzessin had one true heart aboard, and here comes a fine touch of humanity. After making the

round of the ship our chief engineer found in the cabin assigned him a blotting-pad with a farewell message. There were none of the German jeers you might expect, but pencilled appeals in broken English to clean the engines "twice weekly," to feed the "pidgeons" on the "upper deck," and to "oel" the piston-rods regularly for the very good reason that "paking is cast-iren and will be roasting." It seems that the Ober-Ingenieur who wrote this note had superintended the building of the ship in the Stettin yards, and when he took leave of her at Falmouth, they say he sobbed like a woman bereft of a child. Doubtless in the Babylonian captivity of Bodmin he wonders how the engines that he loved are faring, and it should comfort him to know that they are in good hands. Moreover, his blotting-pad message now adorns a British officer's album as so much proof that a true McAndrews may bear a German name.

River and Harbor Bill

All of the individual appropriations of the rivers and harbors bill amounting to \$53,000,000 were stricken out through the efforts of Senator Burton. All that was left of it when it passed was a single paragraph appropriating \$20,000,000 for continuing contract work as follows:

"That the sum of \$20,000,000 be, and the same hereby is, appropriated, out of any money in the treasury not otherwise appropriated, to be immediately available and to be expended under the direction of the secretary of war and the supervision of the chief of engineers, for the preservation and maintenance of existing river and harbor works and for the prosecution of such projects heretofore authorized as may be most desirable in the interests of commerce and navigation and most economical and advantageous in the execution of the work: Provided, That allotments from the amount hereby appropriated shall be made by the secretary of war upon the recommendation of the chief of engineers: Provided further, That allotments for the Mississippi river from the Head of Passes to the mouth of the Ohio river shall be expended under the direction of the secretary of war in accordance with the plans, specifications and recommendations of the Mississippi River Commission as approved by the chief of engineers; And provided further, That at the beginning of the next session of Congress a special report shall be made to Congress by the secretary of war showing the amount allotted under this appropriation to each work of improvement."